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EDISON ELECTRIC INSTITUTE BULLETIN

DECEMBER, 1937

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EDISON ELECTRIC INSTITUTE

STATISTICAL DATA OF THE ELECTRIC LIGHT AND POWER INDUSTRY

Compiled Monthly by the Edison Electric Institute—Covers 100% of the Industry

DURING THE MONTH OF SEPTEMBER

	1937	1936	%
Kilowatthours Generated* (net)			
By Fuel	6,806,453,000	6,424,733,000	+ 5.9
By Water Power	2,947,451,000	2,743,087,000	+ 7.5
Total Kilowatthours Generated	9,753,904,000	9,167,820,000	+ 6.4
Additions to Supply			
Energy Purchased from Other Sources	285,167,000	143,472,000	+98.8
Net International Imports	92,536,000	98,891,000	− 6.4
Total	377,703,000	242,363,000	+55.8
Deductions from Supply			
Energy Used in Electric Railway Departments	42,702,000	40,572,000	+ 5.2
Energy Used in Electric and Other Departments	106,296,000	106,766,000	− 0.4
Total	148,998,000	147,338,000	+ 1.1
Total Energy for Distribution	**9,982,609,000**	**9,262,845,000**	**+ 7.8**
Energy Lost in Transmission, Distribution, Etc.	**1,277,761,000**	**1,352,613,000**	**− 5.5**
Kilowatthours Sold to Ultimate Customers	**8,704,848,000**	**7,910,232,000**	**+10.0**
Sales to Ultimate Customers (kwhrs)			
Domestic Service	1,478,435,000	1,261,410,000	+17.2
Commercial—Small Light and Power (Retail)	1,585,775,000	1,402,087,000	+13.1
Commercial—Large Light and Power (Wholesale)	4,976,960,000	4,539,501,000	+ 9.6
Municipal Street Lighting	167,403,000	196,710,000	−14.9
Railroads—Street and Interurban	325,466,000	338,091,000	− 3.7
Railroads—Electrified Steam	97,314,000	99,363,000	− 2.1
Municipal and Miscellaneous	73,495,000	73,070,000	+ 0.6
Total Sales to Ultimate Customers	8,704,848,000	7,910,232,000	+10.0
Total Revenue from Ultimate Customers	$186,846,800	$175,596,900	+ 6.4

DURING TWELVE MONTHS ENDING SEPTEMBER 30th

Kilowatthours Generated* (net)			
By Fuel	74,173,940,000	66,319,789,000	+11.8
By Water Power	40,445,304,000	36,298,617,000	+11.4
Total Kilowatthours Generated	114,619,244,000	102,618,406,000	+11.7
Purchased Energy (net)	4,302,923,000	3,216,233,000	+33.8
Energy Used in Electric Railway and Other Departments	2,118,594,000	2,175,149,000	− 2.6
Total Energy for Distribution	**116,803,573,000**	**103,659,490,000**	**+12.7**
Energy Lost in Transmission, Distribution, Etc.	**17,998,271,000**	**17,077,775,000**	**+ 5.4**
Kilowatthours Sold to Ultimate Customers	**98,805,302,000**	**86,581,715,000**	**+14.1**
Total Revenue from Ultimate Customers	**$2,170,007,700**	**$2,019,138,900**	**+ 7.5**
Important Factors			
Percent of Energy Generated by Water Power	35.3%	35.4%	
Domestic Service (Residential Use)			
Average Annual Consumption per Customer (kwhr)	785	709	+10.7
Average Revenue per Kwhr (cents)	4.46¢	4.80¢	− 7.1
Average Monthly Bill per Domestic Customer	$2.92	$2.84	+ 2.8

BASIC INFORMATION AS OF SEPTEMBER 30th

Generating Capacity (kw)—Steam	24,139,370	24,007,834	
—Waterpower	9,538,257	9,348,778	
—Internal Combustion	615,953	613,409	
Total Generating Capacity in Kilowatts	34,293,580	33,970,021	
Number of Customers			
Farms in Eastern Area (Included with Domestic)	(869,802)	(650,238)	
Farms in Western Area (Included with Commercial—Large)	(303,934)	(238,914)	
Domestic Service	22,282,652	21,561,465	
Commercial—Small Light and Power	3,861,459	3,797,185	
Commercial—Large Light and Power	568,030	516,177	
Other Ultimate Customers	71,132	62,928	
Total Ultimate Customers	26,783,273	25,937,755	

* By courtesy of the Federal Power Commission, with deductions for certain plants not considered electric light and power enterprises.

Vol. 5, No. 12, EDISON ELECTRIC INSTITUTE BULLETIN; published monthly. Entered as second-class matter Aug. 17, 1933, at the post office at Philadelphia, Pa., under the act of March 3, 1879. Publication office, 56th and Chestnut Sts., Philadelphia, Pa. Editorial office, 420 Lexington Ave., New York, N. Y. Subscription rate, $2.00 per year in the United States; $3.00 per year in foreign countries.

The Edison Electric Institute does not assume responsibility for, nor necessarily endorse or approve, statements made by contributors to the BULLETIN.

EDISON ELECTRIC INSTITUTE BULLETIN

Volume 5 DECEMBER, 1937 No. 12

The Middle Ground In Our Economic System

A Plea for Cooperation Between Government, Industry, Agriculture and Labor

By Floyd L. Carlisle

Chairman of the Boards of Consolidated Edison Company of New York, Inc., and Niagara Hudson Power Corporation

An address delivered at Buffalo, N. Y., Nov. 30, 1937, on the occasion of the presentation of the McGraw Award for Cooperation to Edward A. Brand at a Testimonial Dinner tendered by the Electrical League of the Niagara Frontier. Mr. Carlisle's remarks apropos the award to Mr. Brand are printed on page 508.

IT would be impossible to discuss any part of American business today without frankly facing some of the major problems that all business is confronted with. The economic systems of the entire world have moved from their old moorings and are in the process of change. The World War undoubtedly hastened this movement. The tremendous disorganization produced by the vast destruction of lives and wealth and the dislocation of old, established methods of international and government finance produced such a strain on the old economic order that many weaknesses appeared, the end of which is not yet. The United States of America seemingly prospered immensely as a result of the World War. From a debtor nation, we became the world's great creditor nation. During the period from the end of the War to 1929, we were busily filling the vacuum, largely in capital goods, that the War had created. We endeavored to act as banker for many countries of the world. Time has sufficiently elapsed to look at that period more objectively, and opinions are being revised as to the benefit America may have received by reason of the changes incident to the War.

In the United States today, there are quite sharply and distinctly three schools of thought dealing with the economic system. First is that school believing in state socialism. It would have the Government own and operate all basic industries and minutely regulate all others. Where Government engages in widespread business operations, their effect upon all other economic processes have almost the effect of ownership.

The second major school of thought is that of people who would operate on the Adam Smith theory of laissez faire. The thesis of this school is that certain basic economic laws operate with such finality that any interference with them by Government in the end is harmful and destructive. It is difficult for me, as an American businessman, to follow this principle to its extreme, because in this country we have never operated under such an economic system. Since the beginning of our history, Government has favored, largely by tariffs and at times by direct subsidies, many of our industrial processes and agricultural activities. The greater part of our manufacturing business has grown up under high protective tariffs. This is the antithesis of laissez faire.

The third school of thought is midway between the first and second. This group is, frankly, groping and experimenting, trying to find the solution as to the extent of Government regulation and supervision of the private capital system. Much of the difficulty of this school lies in the lack in America of a trained, permanent Civil Service sufficiently educated and sufficiently removed from purely political interference to give the matter of regulation a keenly economic approach. The success of such a middle course almost is entirely dependent upon the regulatory boards which have to do with industry, agriculture, and labor, functioning upon sound economic rules and unaffected by special groups and special interest. It is my own belief that this middle ground point of view is the road along which American economic life must go, at least for this decade, and it is the duty and responsibility of those of us in industry occupying important positions to cooperate and make the system work.

Personally, I have no fear of the future of America. Progress is never attained by taking counsel of one's fears. America is a very young country. It has in the past gone through periods of change more radical and more disturbing to its economic life than any other country. The American people are a mixture of the bold and venturesome people of Europe. From England, Holland, France, Germany, Poland, Italy and other countries, men and women came to this country to break loose from the old orders in Europe and to live under new conditions. As I think of the enormity of the tasks which my own ancestors were confronted with, I realize how courageous, how energetic, how patient, and how persistent they were. I never travel through Europe without coming back to America with a sense of realization that in an incredibly short period this mixture of people from Europe that constitute the population of the United States have achieved a great destiny. They have performed a great accomplishment. Put ourselves back into the period of the American Revolutionary War. With a little credit against heavy odds, we started this independent nation. Slowly but soundly, industries came into being. Agriculture was improved and extended. Material well-being of the citizens was advanced without aid of the older countries and with the use, almost entirely, of the resources and labor of the people living here. Wealth increased because the

whole population engaged in intensive labor. The wilderness was cleared. The Great West was opened up. At the time of Napoleon's great need, we purchased the Mississippi Valley. In the Mexican War, we acquired by conquest, under that and now so regarded liberal government, the Great Southwest and a portion of the Pacific Coast. These accomplishments were scarcely completed before the enormous disaster of the Civil War overtook us. In that war we destroyed the wealth and savings of whole sections of the country. I have always believed that the confusion and economic dislocations of the Civil War were far greater than have existed in any subsequent period in our history. A nation that could rise from that great internal disaster can rise again from any complexities that confront us now.

The economic well-being of this country is dependent almost entirely upon the volume and velocity of the manufacture and distribution of goods, of agricultural products and of services. When the steel industry of this country operates below 50 per cent, it has little, if any, earning power for taxes or the creation of new wealth for the employment of labor and for furnishing to its labor income with which to buy the things which other industries and agriculture produce. If, however, the steel industry operates at 75 or greater per cent of its capacity, then new wealth is constantly in the making. The purchasing power of this labor is available everywhere, in both durable goods and consumer goods, industry and agriculture. What is true of the steel business is true of all business. The problem of Government, of labor, of agriculture, and of capital is to so cooperate that the maximum of production and distribution is attained.

The degree of government regulation of this process is the outstanding problem in America today. The national credit is entirely dependent upon the prosperity of industry and agriculture. Only in times of great emergency, such as exists in war and such as existed during the great depression, warrant the use of the national credit with unbalanced budgets. I believe that it was a distinct and magnificent contribution the Federal Government made through such agencies as the Reconstruction Finance Corporation and others to meet the acute initial depression and to aid railroads, insurance companies, manufacturers, agriculture and home owners to tide themselves over the distress which followed the tremendous shrinkage in volume and velocity of turnover of goods and services. At the present time, the Federal Government is frankly and sincerely endeavoring to increase this turnover of goods and services. It is desirous of cutting its expenses and balancing its budget through the means of so encouraging the private capital system that it can absorb the unemployed and thus lessen the burden upon the national credit. As soon as the expenditures of Government can lessen and be relieved of the huge unemployment expense, we will begin to be able to reduce our national debt, and the moment that starts a great revival of confidence will occur and our economic system again will produce constantly increasing volume and velocity.

One of the immediate difficulties is the stagnation of new capital flowing particularly into the durable goods industry. It requires an average of $8,000 in capital per person employed in American industry. In the last four years, very little of new capital has flowed into industry. Now, however, the need for it exists, and the latent capital is available; but there has been lacking confidence in the security of its earning power. The Federal Government and industry recognize this problem. The Housing Program which has been announced this week is, in my judgment, a practicable and workable plan to bring great amounts of unused credit into profitable use. This plan has as its basis the use of private capital and not Government capital. The railroads and the public utilities are being looked at realistically by the Federal Government, and I am very hopeful that an improvement in their credit and capacity to buy durable goods and to relieve unemployment is in the process of being greatly aided, if not wholly solved. It is easy to be supercritical of both Government and industry. It is easy to let our imagination run riot and to let doubts and fears dominate our thinking, but it is not a sound and practical way to restore America to economic well-being. Trust, mutual respect, reasonable compromise between Government, business, agriculture, and labor are possible and necessary. America has gone through many crises—mastered them all. This country is not for any one class. It is for all classes. It has in the past outdistanced all other countries of the world in material achievement and in general well-being. If our economic turnover can be restored, it will be the average man, the working man, that will be its greatest beneficiary. Realizing fully the difficulties, tenseness of feeling, and conflicting points of view, nevertheless I believe that we are making distinct progress and that every effort on the part of industry should be directed towards cooperation with Government, and that the temporary recession will be halted and we will move forward to more stable and equitable functioning of our private capital economy.

United States Department of Commerce to Take Census of Electrical Industry for 1937

THE Secretary of the U. S. Department of Commerce, Daniel C. Roper, has announced through Director of the Bureau of Census, William L. Austin, that the Census of the Electric Light and Power Industry covering the operations during the calendar year 1937 will be undertaken soon after the close of the year.

This census, which will cover municipal, federal, state, county, power districts and mutual or cooperative electric light and power systems, is most important to the industry in that the results are used by the Statistical Department of the Edison Elecric Institute and other organizations as "bench mark" data and as a basis for the continuation of statistical data on the industry for the intervening years between the five-year census periods. The schedule is similar to the schedules used in the 1927 and 1932 census. The schedule covers:

Condensed Balance Sheet
Income Statement
Source of Energy
Disposal of Energy, including number of customers, kilowatthours sold and revenue by class of service
Prime Movers and Generators
Fuel Consumption
Circuit Miles of Transmission and Primary Distribution Lines
Employes, Salaries and Wages

"Your Boss And Mine"

By Philip B. Niles

Advertising Manager, American Water Works & Elec. Co., Inc.

An address before the New Jersey Utilities Association, Atlantic City, N. J., Nov. 19, 1937

ALMOST a dozen years ago I sat in a beautifully paneled room in a large city while I listened to an eminent gentleman who was far more familiar with slide rules and logarithms than he was with human nature, expound a sure-fire program for winning public friendship. Although I didn't know much about psychology or customer good will at that time—nor do I now—I was sufficiently well advised to return to my superiors and say that I thought this particular program was all wet. That man had everything figured out. It was very neat—like a formula of physics—you did certain things and then the public would react so. It might have been all right if he had been talking about kilowatt hours or Btu's but one just can't lay out neat little formulas to affect large masses of people.

At that time the utility industry was laying up trouble for itself, albeit it somewhat innocently and unconsciously.

We utility people are wont to sit in hotel rooms in small towns between train times and discuss our problems. Many such symposiums have I participated in and often have I heard this question: "With excellent service, fine reliability and relatively low rates, why is it that the public doesn't like us?" The answer is back there a dozen years or more ago at that period I just mentioned.

Our sins were those of omission and neglect, and not in the great majority of cases any active wrongdoing. Perhaps no industry in the world's history has done a better job, from a physical standpoint, than the public utilities of this country. Splendidly engineered, adequately financed, and at decreasing rates these essential businesses grew to huge concerns in the span of several decades. Yet they made a lot of their own trouble by their failure to grasp the one fact wherein lay the route to a harmonious existence — they were largely unconcerned with public opinion.

Get the lines and stations built, make scientific rates, collect the bills, promulgate regulations and let's get going—that was the temper of our business in those hectic years of growth which commenced following the close of the war.

Not many companies in those days dug

MR. NILES

up and framed that old Latin tag line *vox populi, vox Dei.* Yet today, although we may not believe in its literal translation, I am sure we all feel, at least, that *vox populi* is *vox* very important indeed.

And in this latter belief, the feeling that we must consult with and be governed by our customers' wishes lies the brilliant future of our business today. Brilliant I say, advisedly, because avoiding the Scylla of public ownership on the one side and the Charybdis of oppressive regulation on the other, with help of the public we are sailing into calmer waters.

In the popular mind we are beginning to look more like Dr. Jekyll and if we watch our step and continue to court and earn the good will of our customers it won't be long before we can bury the unlamented Mr. Hyde—wild hair, snag teeth and all.

There is no doubt that only about five years ago we were in plenty of trouble and for two years this trouble got worse rather than better, culminating in the passage of a number of laws almost punitive in design and oppressive in operation. But, with the amazing capacity for meeting troubles and emergencies which is an outstanding attribute of American business, we started to solve our major problem.

It was not surprising that men with the ability to develop this great industry would, when threatened with destruction, have the ingenuity to save it. This process of salvation did not prove highly complicated. It involved no predetermined formulas or slide rule stuff. Rather was it a matter of learning to talk in words that people understood and treating our customers the way we would like to be treated ourselves, as individuals.

Gone were the advertisements of great power plants belching smoke, their text dripping with K.V.A.'s, synchronous condensers, and bus bars. (By the way, I have always thought that "bus bar" name was the best job of terminology the engineers ever did. Although I am rather vague as to its meaning it has sort of a convivial sound which is more than can be said for "high pressure steam turbine" for instance.)

No longer did a utility ad in Squeedunk look like one in Kokomo. Remember that lady in the sort of Mother Hubbard apron who, reproduced in line cuts, opened refrigerators, ran vacuum cleaners and toasted muffins with ubiquitous regularity from Maine to Florida, from California to our own New Jersey? She disappeared.

I could cite illustrations of rules or policies which are now being modified or changed that have made our customers mad. None of them morally wrong or unethical, but most of them so devised as to be annoying and when taken in a lump sufficiently important to throw the scales of public friendship temporarily against us.

Temporarily, I believe is correct, for as I indicated a moment ago, I think we as an industry are sailing out of the storm. The waves are still high and the wind yet blows hard, but I think calmer water is ahead.

If you travel around this country as I do and ask people questions about utility matters you will find today that they have no active hate against the public service enterprises that serve them. Some of them may voice a vague distrust of the "power trust" or something about Wall Street but almost all of these people will tell you that their own home

utilities are pretty regular. I think we can take credit to ourselves for having brought about a large part of this change in sentiment. Not by propaganda or pressure, but by realizing that the average American is a pretty decent self-respecting individual of some intelligence, who if given fair treatment and explanations will give his friendship in return.

In the Company with which I am associated, we have organized our thinking on this problem of public relations and developed our practices to accomplish certain definite ends, although we have no fixed formulas. We believe that we have economic and social relationships with, as well as responsibilities to three important groups of people. Let me say I don't think this is startlingly original, for many other companies—industrials as well as utilities—are thinking along these lines. These three groups of people I just mentioned are, and not in their order of importance, necessarily, with regard to the latter two: the public we serve, our employees and our security holders. I would like to discuss in a general way our activities as affecting these people who really are the authors of our being.

In the first place it is very important to know what people think about you, as an organization, before you can actively start a public relations program directed at the customers served. I don't mean what you think people think about you, I mean what their actual feelings are. In this connection we find the use of surveys to collect and correlate information extremely helpful. By surveys, I don't mean that we go out and ask people a number of questions and then compile the answers. We have found that there are firms who have had great experience in market research and that several of these organizations are equipped to carry on an inquiry directed at those more indefinite matters which are covered by the general classification of public relations.

The handicap which must be overcome by an organization in making its own inquiry is the fact that wishful thinking is almost sure to make its appearance in the formulation of the questions in the survey. We found that a competent organization, without in any way revealing for whom the survey is being made, can bring back most interesting results. We feel that a check of this kind occasionally in the operations of a utility property is an exceedingly wholesome thing to do, and will furnish almost what might be termed "inside information" to aid in the development of policies which affect the customers.

I would say that the Company interested in finding out the true state of mind of its customers would be well advised to consider a careful public relations survey conducted among a large enough sample of its customers to return information which could be taken as relatively typical of the state of mind of the public concerning that utility.

A little while back I mentioned advertising and the change that had occurred in the type of copy that utility companies are now using. This change is one of the most salutary things that has occurred as far as the industry's public relations activities go. After all, an advertisement is the mirror of the Company and its policies. If it is intricate and stilted and full of technical terms the public is almost sure—those of them who read it—to get the impression that the concern sponsoring the copy must be a pretty stuffy crowd.

Our organization has been, for years, a great believer in advertising directed at the large mass of its customers. We have found that in the past we fell into the mistake of occasionally advertising to ourselves. This is a pitfall that many utility companies have been unable to avoid and their failure to do so is readily understandable. Many things which we in our industry find intensely interesting and fascinating, from our own internal point of view, are dull and uninteresting to the general public. For instance, in advertising our water, we have found that if we say it is pure and wholesome and that we employ every modern means to keep it so, it is more effective to the public who runs and reads than to say we use the processes of sedimentation, filtration, chlorination and sterilization.

We have one general test for all our advertising copy and that is its appeal to the people it is intended to reach. We try to translate every public statement of any of our companies into terms of the enlightened self-interest which, in the final analysis, is the spirit in which the customer reads them. We have found that in advertising utility service it pays to be brief, pleasant and frequent.

The constant use of small copy, couched in simple terms, with effective illustrations, will in the course of time help to create in the minds of the customers a tolerance and friendliness which is extremely desirable.

I want to briefly mention publicity, although this word and its more sinister brother "propaganda" have perhaps a somewhat evil reputation.

It has been our experience that operating utility companies are a constant source of information which, if someone is detailed to handle it, is welcomed by the press and public as news. Recently there came to my attention a pamphlet published by the American Bankers Association which took up the value of publicity to banks and stressed the importance of these financial institutions availing themselves of opportunities to receive publicity in the newspapers which served their customers.

We like to have the newspaper men in the towns in which we operate have our companies as regular stops on their "beats." It doesn't always happen that we can give them a news story but very often, if the operating official is alive to what constitutes news, an effective story can be written which helps the newspaper, its reporter, and the utility, and is entirely legitimate and ethical from every standpoint.

While on the subject of publicity, it is important to remember that events which we must classify as unfortunate make news stories too—stoppages in service, accidents and matters of this kind come under the general heading of bad news. We feel that when an accident does occur and we are queried about it by a newspaper, with a legitimate interest in the event, we should release the pertinent information with no attempt to smother or cover up the news.

I don't want you to get the impression that I believe every operating utility official can be made into a skilled publicity man. I do feel that an active public relations department, cooperating with the operating men, can impress them with the rudiments of news and help to bring about a harmonious business relationship with the press which is extremely valuable.

Needless to say, in our business or any other, appearances are most important. I mean the physical properties and offices. By and large as an industry, I believe we are way ahead of the general procession in this important respect. Our plants are neat and clean, and well maintained. If there is any weak spot in this respect I think it is sometimes in our business offices. It is surprising what can be done by use of a little paint,

a few new lights, some new desks and counters, venetian blinds and other minor improvements.

The public wants and expects to carry on its business in pleasant surroundings and it is up to us to create this kind of an atmosphere in our business homes.

These are a few high spots with regard to our customers. Now the second group of people I mentioned is our employees. I am going to assume, and I know it to be true in many companies, that the management has provided group insurance, fair pension policies and opportunities for advancement. I want to dwell for a moment on what can be done to tie the employee group into your program of making George Spelvin like you. I think the keystone of the employee program is a strong company paper or house organ.

This publication, through its editorial policies, should continually impress upon the readers in their own interest the necessity for friendly courtesy and intelligent interest in the wants of the public. Don't misunderstand me—a company paper cannot be filled with this type of editorial matter to the exclusion of all else. It must be supplied in homeopathic doses and implemented with material of a morale building character. Articles that make for solidarity in the organization and that create a spirit of team work are extremely important. Last but not least it has been our experience that it is important to add to your other editorial contents a strong leaven of personal or human interest material. Marriages and bridge parties, births and deaths, these and countless other little items provide the savor which tempts the reader to the more solid nourishment, which I have just described.

The utility employee being the same kind of a person as almost anybody else becomes careless sometimes; and routine becoming rote allows the fine edge of courtesy and friendliness to become dulled.

Particularly at this juncture in public utility affairs we believe it extremely important that our operating staff be impressed with the importance of harmonious relations with our customers. To aid them in their difficult job of waiting on and serving the public we have recently produced a sound slide film, covering the important elements of making friends with the public. This production introduces the subject from the standpoint of the employee's own self interest and then in a series of right and wrong way examples tells how to carry on their duties so as to make friends with our customers.

There is nothing servile in the production's approach to the subject. We stress the importance and dignity of the job, and the necessity for doing it right. We are showing this film to all our people at small group meetings followed by a dinner at our expense, and to each employee is given a special edition of our company paper, which in words and pictures ties down the essentials of the film and its accompanying talk.

These showings of the film are to be followed by brief discussion groups—"customer clinics" we call them—in which our people act out the parts of enquiring and sometimes complaining customers and various members of our personnel are selected to wait on the fictitious characters so represented. We furnish the scripts for the customer but it is up to our employees to give the right answers based on their own experience and natural intelligence, and their associates are there to applaud or criticize. Everyone will have a chance. We think these clinics will be stimulating.

We have found the sound slide film a singularly effective medium for instructional purposes. It is extremely flexible and its cost is not great. We have under contemplation its further use perhaps outside our own family of employees, among business and social groups in the territories where we operate.

The final, but not necessarily the least important, social group that makes possible our existence is that part of the public who have put up the money to finance our operations. The relationship between management and the security holders is a question that is getting a great deal of study at this time. It would seem that our stockholders are somewhat apathetic. Is this their natural state or is it a condition? This is a hard question to answer and could serve as the subject for long speech in itself. Suffice it to say that stockholders should be periodically furnished with information about their investment.

Regardless of how you look at the matter, it would seem that the thing that interests the stockholder most is financial information. We have tried to supplement our interim and annual reports with other material of a newsy and more general nature. We believe this is important and worthy of greater effort. Nevertheless, it must be remembered that our stockholders are subject to the same impressions as are we, though perhaps to a lesser degree, and it is reasonable to assume that for some years they haven't been completely happy in their minds.

If we win the public to our side and make them like us and desire that private management continue to be responsible for these essential utility services, I am sure that we won't find it hard to prepare and send a very interesting and stimulating series of letters or messages to our security holders.

If you will look around our industry you will find many important and effective programs now being carried out which are remaking the public relations of this great business. And in our own ranks we have already developed men of great ability in this important phase of operations. We, as a company, have used many ideas developed by others and all of us can profit by a familiarity with the public relations activities of our neighbors.

It was an adopted Jersey man, Bill Roper, who said, "A team that won't be beaten can't be beaten." I think that kind of spirit imbues our industry today. If I am right and we bring to bear on these problems all that we have of intelligence tinctured with kindness, tolerance and understanding, I am sure we will find the American people fair and reasonable. For when all is said and done, we must remember that these customers are "Your Boss and Mine," and a pretty decent crowd to work for, I have found.

Next World Power Conference in Vienna

PREPARATIONS are now under way for the World Power Conference which will be held in Vienna from August 25 to September 2, 1938, according to a report to the Bureau of Foreign and Domestic Commerce from the office of the American Commercial Attache, Vienna.

Subjects to be discussed at the conference include electric power requirements for agriculture, trade, the household public utilities, and electric railways, the report states.

It is reported that a committee composed of the Section Chief, the Director General, and other officials of the World Power Conference, with offices in Vienna already has begun preliminary preparations for the conference.

Mr. O. C. Merrill, First Vice-President of the International Executive Council of the World Power Conference, with offices in Washington, is in charge of arrangements for United States' participation in this event.

Why Do You Need A Medical Service?

By Wills Maclachlan
Consulting Engineer, Toronto, Ont.

IT is simply a truism to say that the efficient operation of any public utility is dependent to a very large extent upon the mental and physical health of the staff.

Advice of Engineers is obtained in maintaining the fitness of the material plant. Financial advisors are used to develop the financial structure and legal advisors are used for technical guidance in legal matters. Although there is a growing number of public utilities which are taking advantage of the advice of the Medical Profession to assist in maintaining the mental and physical fitness of the staff, many companies have not as yet availed themselves of this aid.

The Subcommittee on Health has received reports from utilities employing over 75,000 employees and it is reported that the employees of these utilities lost from two to over seven days per employee per year, on account of illness. This higher figure comes from a utility that has kept a very accurate record of lost time from illness on the part of employees, for over twenty-five years and from the analysis of the record, it is felt that this figure of over seven days per employee per year, is the most accurate gauge of the lost time on account of illness. This figure is also obtained where medical supervision has been in effect. Where this service has not been used the lost time from sickness, will greatly exceed this amount.

There are few companies which have not an organized plan for the prevention of accidents to employees. This effort on the part of employers generally, has not only been accentuated by the advent of Workmen's Compensation Acts under which the employer either individually or with others is responsible for the costs of these accidents, but also from the proven fact that Accident Prevention pays, on account of increased efficiency. One large public utility kept an accurate record of the amount of lost time on account of industrial accidents; also the amount of lost time due to illness among the same group of employees, and it was found that the lost time due to illness was ten times the amount of lost time resulting from accidents. If, therefore, Accident Prevention activities pay dividends, it naturally follows that an effort to decrease sickness among a group of employees will pay much higher dividends.

MR. MACLACHLAN

Within the past thirty years, Public Health efforts in Municipalities, States and Countries, have proved that medical science has available to it now, tools, which if used, can prevent a considerable number of diseases which, up to that time, had caused great ravages among the population. One has but to mention the decrease in typhoid fever on account of clean and safe water supplies; the inroads made into tuberculosis by isolation and training in sanitaria and almost the extinction of smallpox by the use of vaccine. Is it not reasonable to suppose, therefore, that by applying to industry these medical tools, that it will be possible to cut down to a very great extent lost time due to illness?

Although the study of mental health has received the attention of humanity for centuries, it is only within the last short time that real progress has been made in the treatment of mental diseases. As in all medicine, the major and severe types of disease received the first attention, but one has but to review the wonderful advance that has been made during the last fifty years in the treatment of patients in mental hospitals to realize the progress made in Mental Hygiene. It has, however, only recently been appreciated that slight mental illnesses (something comparable to the slight cold in physical illness) might be corrected by skilled mental treatment.

Although the curative phases of the work of the Medical Profession have made great advances and the use of them in industry would be of very considerable value, yet the preventive measures that could be put into effect to keep well people well, would pay dividends very much in excess of the curative measures. From both the mental and physical side, if industry would avail itself of the advice and skill now obtainable from the Medical Profession, it would find that it would be possible to maintain an alert and fit staff fully capable of increasing the whole efficiency of the utility.

A series of articles on Medical Service in Industry has been prepared by the Subcommittee on Health, composed of: Dr. Hart E. Fisher, Chicago; Dr. Noel G. Monroe, Boston; Dr. J. J. Wittmer, New York City; Professor Morris Viteles, Philadelphia, and Wills Maclachlan, Toronto, Ont., Chairman.

These articles will appear monthly in the "Bulletin" and will present different phases of the types of assistance that can be given to industry by the Medical Profession. The Introductory article appears on this page.

The Subcommittee will welcome comments and discussion of these articles. These comments should be addressed to the

SUBCOMMITTEE ON HEALTH,
Edison Electric Institute
420 Lexington Ave., New York, N. Y.

Original Cost Determination

PAPER No. 1

By J. V. Cleary

Assistant Controller, Consolidated Edison Co. of New York, Inc.

Presented before the National Accounting Conference, E.E.I., Detroit, Mich., Nov. 9

AMONG the more important provisions contained in the Uniform System of Accounts as prescribed by the Federal Power Commission and various State Commissions are those relating to "Original Cost" and the Plant Acquisition Adjustments Accounts.

It is not the intent of this discussion to debate the legality, soundness or reasonableness of these provisions but rather an attempt to consider briefly in a constructive manner some of the problems to be encountered and to outline a few suggestions which might be helpful in the determination, within reasonable limits, of "Original Cost" as I interpret it.

Before proceeding with the discussion it might be well to consider several related definitions as contained in the new classifications.

Original Cost: "Original Cost as applied to Electric Plant means the cost of such property to the person first devoting it to public service."

Cost: "Cost means the amount of money actually paid for property or services or the cash value at the time of the transaction of any consideration other than money."

Book Cost: "Book Cost means the amount at which property is recorded in these accounts without deduction of related reserves or other accounts."

These definitions introduce some new and entirely different concepts of "Cost" especially the definition of "Original Cost."

The determination of "Original Cost" of the property comprising a given operating system invariably would require a detailed analysis and reclassification of all of the Plant Accounts involved. In few cases will it be found that the corporate history of a utility is not complicated by reorganizations, mergers, the acquisition of complete operating systems, the restatement of fixed capital investments due to Regulatory Commission Orders, etc. In fact, such complications are the rule rather than the exception with most large utilities at the present time. Since this is the case, the Plant Accounts of such companies may be a mixture of actual original cost for property constructed by the utility, acquisition costs for operating systems or purchase costs for isolated items of property purchased from other companies. In order to attempt to comply with the new requirements, it becomes necessary for the utility to make detailed examinations and after careful study restatement of property accounts in terms of "Original Cost" as previously defined, and, where necessary, to establish the "Plant Acquisition Adjustment" Account.

MR. CLEARY

The text of the Electric Plant Acquisition Adjustment account in the Federal Power Commission Uniform System of Accounts states "This account shall include the difference between (a) the cost to the accounting utility of electric plant acquired as an operating unit or system by purchase, merger, consolidation, liquidation, or otherwise, and (b) the original cost, estimated if not known, of such property, less the amount or amounts which may be credited to the depreciation and amortization reserves of the accounting utility at the time of acquisition with respect to such property."

The texts of the corresponding accounts as set up by most other Regulatory Bodies are substantially in accord with that of the Federal Power Commission.

It must be understood, of course, that conditions in the different companies vary widely and, in general, methods finally selected to comply with the new regulations can best be determined by each utility only after consideration has been given to the specific problems involved.

Generally, the first step in determination of "Original Cost" would be a review of the history of the company with special regard to its organization and the acquisition of other companies or operating systems, the extent to which appraisals may be reflected in the Plant Accounts and other special conditions. As a matter of fact, such a step has been made mandatory for companies under the jurisdiction of the Federal Power Commission through an Order issued May 11, 1937, supplementing its Plant Reclassification Instructions by requiring the submission of Data relative to the history of each public utility, its acquisition of electric operating units or systems, the original cost thereof, the amounts entered in the books in respect thereto, the method of determining original cost and much related information.

As a result of this overall review the costs in the various accounts may be grouped for more detailed study, somewhat as follows:

(1) Property wholly constructed by the Operating Company.

(2) Property acquired as an operating system or an isolated unit from another company, where such property was previously devoted to the public service.

(3) Property carried on the books at amounts other than original cost due to the use of Appraisals, Orders of Regulatory Bodies, etc.

(4) Property acquired from other utilities where such property was *not* previously devoted to public service.

The methods of procedure to be adopted for the detailed analysis and classification of those groups will to some extent differ for different classes of property.

It will be pointed out subsequently in this discussion that the original cost of

a complete Outside Plant Operating System may most easily be determined by pricing an inventory of the existing property at unit prices developed from an analysis of the capitalized expenditures.

On the other hand, for other classes of property, such as individual plants, the overall original cost may, in some instances, best be established by an analysis of the accounts, and a thorough review of the costs as classified in each of the foregoing groups.

A brief outline of the extent and manner in which this review might be made for each of the four general groups follows:

Group (1) Property Wholly Constructed by the Operating Company

Where the property was wholly constructed or installed by the present Operating Company, it follows that the cost to the company is, in general, the original cost of the property represented by those expenditures. However, a thorough study must be made to establish the fact that costs were properly classified; that proper retirements were made as property was removed or reconstructed. A large part of the investment can be readily verified by comparing the quantities of principal units charged on the books with those actually in service on the system, making use of various operating and plant records. Additional retirements, adjustments or reclassifications can then be made as required.

Group (2) Property acquired as an operating system or an isolated unit from another company, where such property was previously devoted to the public service.

Properties included in this group probably present the most difficult type of problem in the determination of "Original Cost."

The first step would be to determine whether or not the records showing the cost to the company first devoting the property to the public use are available. However, care must be taken to avoid accepting as "Original Cost" figures obtainable from the records of the company from which the property was obtained, without first verifying the completeness of such cost. For example, the original purchase price of a parcel of land may not by any means represent its original cost when first devoted to the public use. Substantial amounts may have been expended for filling, grading and other improvements necessary to put the property in usable condition, which elements represent very definitely a part of the original cost. In the event that the prior company records are not available, then the "Original Cost" must of necessity be estimated. This might be accomplished by pricing the acquired property at costs available for similar property constructed during the same period, or might be based entirely on engineering estimates.

In the event that the "Original Cost" is to be determined by engineering estimates, it follows that there must be available, or prepared, an inventory in some degree of detail. Where the "Original Cost" is determined for the property as it existed at the time of acquisition, a thorough review must be made of all subsequent retirement entries against the property acquired. It is possible in some instances, particularly in the earlier days of the industry, that retirements may have been inadequate or entirely neglected. It is also conceivable that excessive retirements may have been made. In the event that substantial portions of the acquired property were subsequently retired, it might be found desirable to determine the "Original Cost" of only those portions remaining as of the date of the examination.

It should be noted that the difference between the established original cost and the book cost for a particular acquisition, which under the new system of accounts, must be transferred to the Plant Acquisition Adjustment Account, might be a credit and may tend to offset debit entries for other acquisitions.

Group (3) Property carried on the books at amounts other than Original Costs due to the use of Appraisals, Orders of Regulatory Bodies, etc.

In numerous cases properties have been recorded on the books at values established through appraisals, write-ups or write-downs, made either through decisions of the management of the utility or through Orders issued by regulatory bodies. Properties classed in this group may in some instances have been constructed by the operating Utility or may have been acquired through purchase, consolidation of predecessor companies or other means. The manner of determining the original cost must be governed by the conditions concerning each individual case. In the event that the property involved was constructed by the operating company, the difference between the book cost and the established original cost under the Federal Power Commission Uniform System of Accounts would presumably be classified under Account "Electric Plant Adjustment."

Group (4) Property acquired from other utilities where such property was not previously devoted to Public Service.

Since the instructions provide for establishing the original cost of property when first devoted to the public use, it may be assumed that in the case of a legitimate "arm's length" transaction, where property was acquired from another utility and had not been devoted to public use by that utility, the purchase consideration is the "Original Cost."

In general, in determining the manner in which the "Original Cost" of property is to be established, it should be borne in mind that factual data supported by books of account or other historical sources of information is usually more easily sustained than engineering estimates.

Reference has been made in a few instances to the Electric Plant Acquisition Adjustments Account and its relation to original cost.

The Federal Power Commission provides an account entitled "Electric Plant Adjustments" which shall include the differences between Original Cost and Book Cost of Electric Plant to the extent that such difference is not properly includable in Electric Plant Acquisition Adjustments Account.

The Electric Plant Adjustments Account is apparently provided principally to account for write-ups of electric plant prior to the effective date of the System of Accounts. This account is a separate

balance sheet account, whereas the Electric Plant Acquisition Adjustments Account is a subdivision of balance sheet account "Electric Plant."

Both accounts provide that the amounts included therein shall be depreciated, amortized or otherwise disposed of as the Commission may approve or direct.

In this connection it may be pointed out that the Supreme Court of the United States recently secured a commitment from the Federal Communications Commission as to its understanding of the way it would interpret its Acquisition Adjustments Account. This commitment states "Amounts included in Accounts 100.4 that are deemed, after a fair consideration of all circumstances, to represent an investment which the accounting Company has made in assets of a continuing value, will be retained in that account until such assets cease to exist or are retired."

Continuing Inventories

One of the first determinations which must be made by each company is the extent to which plant inventories will be used in the establishment of "Original Cost". Further consideration must be given to whether or not continuing property records will be established and maintained.

The establishing of continuing property records has already been made mandatory by the Public Service Commissions in several States.

The Federal Power Commission and some State Commissions do not specifically dictate the preparation and maintenance of complete plant inventories, but it would appear that in order to comply with their many exacting requirements, some form of Continuing Property Record must be established.

For certain classes of property the pricing of a detailed inventory appears to be the only practical means of determining "Original Cost". This is generally true for distribution systems which are made up of many thousands of similar items, such as poles, sections of underground conductor, meters, services, etc. To make a detailed analysis of the thousands of entries in the accounts (debits and credits) for such a system would be a hopeless task.

A detailed inventory of the existing plant can be prepared showing the quantities of each size and type of item for each account, classified, if possible, by year of original installation.

Unit costs may be developed through the analysis of a sufficient portion of the capitalized expenditures in each account. In general, it will be found advisable to develop average unit costs for each year for each type of item.

By applying the developed unit costs to the inventory quantities the total original cost can be established and it follows that the difference between this cost and the book balance will represent a net book adjustment, thus eliminating the necessity for a detailed analysis of all the entries in the book accounts. The net difference in each account may be disposed of either by reclassification, retirement or other appropriate adjustment.

On the other hand, the situation with respect to Inside Plant properties (substations, generating stations, general structures, etc.) is somewhat different. Usually, accounting records are available which reveal the history of the investment for each plant, especially when such plant was constructed by the operating utility.

A detailed inventory of the plant classified by location and account should be prepared.

The history of each location should be studied and any salient information regarding initial construction, extensive reconstruction and expansion of facilities, acquisition of property from other utilities, etc., should be carefully reviewed.

A thorough analysis of the book entries covering additions and retirements should be prepared, and the reasonableness of the retirements should be tested by association with the original installations. This analysis should be carried out generally in accordance with the four groupings previously outlined.

An overall comparison can then be made between the Continuing Property Records and the information derived from the historical review and the cost analysis, and any necessary adjustments, reclassifications, additional retirements, etc., may be determined.

The adjusted total for each account may then be certified as the reasonable original cost.

The matter of apportioning this established investment over the units making up the plant inventory is then a secondary matter.

Example of Original Cost Determination

As a concrete example of what can be accomplished in the way of determining original cost for a complete system, we might review briefly the procedure followed and results obtained in connection with the establishment of original cost for the Outside Electric Plant System of the former The New York Edison Company, now included by merger with the Consolidated Edison Company of New York, Inc.

History of System

The area covered by this distribution system comprises the major portions of two boroughs in New York City. In one borough the system is entirely A C, both overhead and underground. In the other borough the system is entirely D C and is underground. In the course of forty years of operating these properties, there have been several major changes and developments, which involved replacing substantial portions of the original systems.

The corporate history of the Company dated back to 1901, the Company having been formed at that time by consolidation of two former operating companies. The portion of the property which was acquired from predecessor companies, and was still existing as of the date of the original cost determination, represented something less than 2% of the total investment at that time.

Available Records—Material and Data

Both the accounting records and operating records were fortunately reasonably complete. From date of organization—1901, the Company maintained a detailed construction or plant ledger which showed the expenditures classified by account for each borough. Work order records were available as far back as 1904. There were practically no records from which to determine the cost to predecessor companies of the property acquired at date of organization and existing at the time the basic inventory was prepared.

A very modern detailed system of operating maps was established some ten years ago which recorded rather completely all of the operating property.

Method of Determining Original Cost

In view of the fact that we were definitely committed by an Act of State Legislature and Order of the Public Service Commission to establish Continuing Property Records, it was decided that the original cost of this property could best be determined by the actual

pricing of a basic inventory, which was to be perpetuated as a continuing property record.

Briefly, this was accomplished as follows:

(a) *Preparation of Basic Inventory*

At the very outset in our project of determining original costs, there was developed a code of units of property which set forth exactly which property items were to be considered as units, and which minor items were to be associated with the unit. Since the analysis of the books and preparation of the inventory were done concurrently, this code was the means of coordinating the two operations, so that the unit costs developed were readily adaptable to the units presented by the inventory.

A detailed inventory was prepared from the Company's existing operating maps and records, listing according to the code of units of property, each unit showing the quantity, size, type, etc., as well as the year of original installation. In some instances, where dates were lacking they were estimated. Certain field spot checks were made to insure the accuracy of the quantities as compiled from the operating records. The detailed quantities for each account were summarized by year of original installation. Thus there were available for each P.S.C. account and separately for each borough, summary tabulations of the quantities of the various sizes and types of items making up the operating system, classified in accordance with the year of original installation.

(b) *Determination of Unit Cost*

Unit Installed Costs were established from an analysis of the books for each size and type of inventory unit for each year. These established unit costs included all elements of cost which had been capitalized on the books. Generally, it was found that several sizes and kinds of cable or other items were installed on one work order which necessitated the apportionment of the installation costs. This was accomplished by means of ratios established by the Engineering Department.

Due to the large number of items installed in any one year, it was found that representative unit costs could be established by an analysis of approximately 50% of the total gross additions.

In a few instances, it was found im-

(*Continued on page* 492)

SALES—ELECTRIC REFRIGERATORS

(Household Models Only)

MONTH OF OCTOBER AND FIRST TEN MONTHS OF 1937-1936

	Month of October 1937	Month of October 1936	Month of September 1937	First Ten Months 1937	First Ten Months 1936
Total United States	67,857	44,380	82,688	2,169,744	1,878,062
Maine	261	43	183	8,227	7,021
New Hampshire	177	214	284	6,537	6,184
Vermont	199	37	(2)	5,321	4,323
Massachusetts	2,534	1,499	3,976	87,036	72,824
Rhode Island	52	163	616	11,328	9,302
Connecticut	786	965	1,569	38,321	32,035
Total New England	4,009	2,921	6,626	156,770	131,689
New York	11,854	9,295	15,095	256,176	219,457
New Jersey	2,743	2,105	4,173	86,515	79,953
Pennsylvania	4,804	4,537	7,715	210,209	173,319
Total Middle Atlantic	19,401	15,937	26,983	552,900	472,729
Ohio	2,979	2,454	7,000	157,040	122,951
Indiana	1,926	924	1,513	61,387	52,937
Illinois	7,130	2,749	4,992	169,895	137,589
Michigan	5,665	1,759	2,933	117,414	92,064
Wisconsin	2,889	422	506	46,913	31,256
Total East No. Central	20,589	8,308	16,944	552,649	436,797
Minnesota	1,712	596	3,462	39,651	26,064
Iowa	853	397	981	32,427	28,624
Missouri	931	470	2,110	61,903	59,008
North Dakota	336	(3)	146	3,923	2,915
South Dakota	116	64	61	4,470	4,818
Nebraska	395	55	589	15,707	16,213
Kansas	304	243	(67)	23,309	22,035
Total West No. Central	4,647	1,822	7,282	181,390	159,677
Delaware	159	109	437	5,005	3,660
Maryland	785	521	1,229	27,141	20,599
District of Columbia	1,038	445	1,243	18,056	18,184
Virginia	1,213	442	1,313	33,890	29,587
West Virginia	277	95	180	25,331	23,262
North Carolina	643	296	1,101	44,820	35,561
South Carolina	439	189	394	21,686	17,337
Georgia	1,473	430	513	37,768	31,135
Florida	2,894	2,271	1,687	28,162	27,100
Total South Atlantic	8,921	4,798	8,097	241,859	206,425
Kentucky	183	375	1,235	28,302	25,042
Tennessee	540	685	1,316	34,422	28,914
Alabama	472	279	1,120	23,854	21,146
Mississippi	33	155	(285)	10,940	10,744
Total East So. Central	1,228	1,494	3,386	97,518	85,846
Arkansas	252	67	105	11,932	10,938
Louisiana	404	668	1,242	22,278	19,336
Oklahoma	147	98	462	21,393	18,765
Texas	2,454	1,011	2,906	86,290	76,601
Total West So. Central	3,257	1,844	4,715	141,893	125,640
Montana	201	56	48	8,279	8,764
Idaho	133	60	502	9,004	8,972
Wyoming	25	7	27	2,929	2,840
Colorado	227	129	229	14,011	13,731
New Mexico	209	16	83	4,546	3,683
Arizona	257	112	611	7,515	5,885
Utah	98	134	157	11,439	11,182
Nevada	141	93	15	2,508	2,760
Total Mountain	1,291	607	1,672	60,231	57,817
Washington	361	343	982	31,467	31,059
Oregon	425	205	498	16,527	19,567
California	3,728	6,101	5,503	136,540	150,816
Total Pacific	4,514	6,649	6,983	184,534	201,442

Figures based on report by the NEMA on Net Sales to Dealers and Jobbers.

Original Cost Determination

PAPER No. 2

By H. W. Endres
American Gas & Electric Company

Presented before the National Accounting Conference, E.E.I., Detroit, Mich., Nov. 10

IN recent years the electric public utility industry in this country has, perhaps, come in for more, much more than its just part of criticism and attention from those who set themselves up as the reformers or readjustors of a system of national life. In the new arrangement of "economic planning," so-called, the electric public utility industry has, perhaps, been projected further into the foreground than it ever should have been.

I am an engineer. I do not decide, nor attempt to decide, the wisdom of these newly advanced theories affecting the business which I believe all of us here present are engaged in and I must admit as one of those charged with the administration of some of these new theories that I am almost nonplussed. I want to go along because my employer has said to me, "It is the law," or "It is about to be the law." Therefore, to the best of my abilities, I must try to meet the conditions which confront the industry.

One of these new theories never heretofore advanced so far as I know, is the new concept of "Original Cost" confused by many with the term, "Historical Cost."

This new theory of "Original Cost," which is being written into the conditions of new accounting classifications by which the electric public utility industry must apparently abide, is one of the most important matters which confront us here today.

It is a well-known fact that many of the present-day large electric public utility companies have been built up to their present proportions by the acquisitions through merger, purchase, or otherwise, of a number of small companies and that no records of original cost are available with respect to these small companies whose physical properties found their way into these large systems. Even where records of acquired companies are available, it is conjectural whether original cost can be determined from them or whether these records would truthfully reflect the original cost.

There appear to be at least two schools of thought with respect to the determination of a method to comply with this new theory of original cost for electric utilities.

The first method is to record in "Account 107 — Electric Plant Adjustments," any amount, or amounts, which are made up of the difference between the dollars of Fixed Capital as shown on the company's books and the actual cost of the property. This is with respect to property constructed by the company, and where differences consist of "write-ups" or "write-downs" these amounts can possibly be readily determined. If a company has "written-up" or "written-down" property values, on its books, as of a date certain, there should be little or no difficulty in determining the amount or amounts thereof. It will then be necessary to determine, if possible, the difference between the cost to the accounting utility of electric plant acquired by it, through purchase or otherwise, and the original cost of such plant to the person or persons who first devoted it to public service. This difference will then be recorded in "Account 100.5—Electric Plant Acquisition Adjustments." The difference between the sum of these two accounts; i.e., 100.5 and 107, and the dollar's amount of the Fixed Capital as shown on the books of the accounting utility is the original cost.

To follow this method specifically, it is necessary to have available inventories of the acquired properties which inventories were made at the date or dates of acquisition, as well as the dates when the various parts of such property were constructed or installed so as to be able to estimate whether the purchase price might have been more or less than the original cost. This is based on the assumption that the original cost is not ascertainable from the available records of the purchased company and in most cases, probably, it will not be so determinable. It is also based on the assumption that the cost to the buyer of the property of the purchased company was spread on the books of the buyer at the purchase price.

If this practice has been followed, retirements of purchased property were undoubtedly based on the purchase price on the books of the buyer and these must be adjusted in order to show the original cost. Quite often it may be found that these inventories are no longer available and for this reason this first method often fails.

It may be the intention of these new accounting classifications to do nothing more than require the accounting utility to use due diligence in trying to determine from available records of acquired companies whether or not such property was or is recorded on the books of the purchasing company at amounts other than the original cost thereof, and not to burden the accounting utility with the work of establishing an estimated original cost. This entails less effort on the part of the accounting utility because the work involved will be in the nature of an estimate made by accountants or engineers, or both, of the original cost of the acquired property or properties.

At this point I am fully willing to admit that my mind "bogs down," so to speak. I cannot encompass the mechanics of what will take place, or may take place, and this is the underlying reason why I cannot subscribe to this first method, as a solution to the problem before us. However, if this method is used, an inventory of all existing property must be made, which inventory will separate constructed property from acquired property, and by means of a "cut and try" method, unit costs must be determined which when applied to the inventories will aggregate the original cost of both the constructed and acquired property, as adjusted. This is necessary in order to comply with the provisions of these new "Classifications of Accounts," which state that all property must be retired at the original cost thereof. Of course, this latter is an added step. By the very nature of the provisions of these new accounting classifications, "Original Cost" becomes a basis of all retirements and therefore it cannot be disregarded.

The second method consists of the making of an inventory of all existing

property and I should like to say at this point that notwithstanding some criticism, which I must admit cannot be refuted, I believe that this second method is the only one that can be practically applied in a great majority of cases. By using this method the accounting utility is not concerned with property which no longer exists but is establishing the original cost of existing property only. This inventory must separate the property which was constructed by the utility from that which was acquired and each acquisition must be recorded separately. The dates of construction, whether the property was constructed by the accounting, or by the acquired utility, must be determined actually, and, if this is not possible, they should be estimated and unit costs established for each year of construction of the entire property.

These unit costs are then applied to the items of property contained in the inventory of constructed property and the difference between the recorded balance of book value of constructed property and the priced inventory should be shown in Account 107, even though the company has made no deliberate "write-up" or "write-down" on its books. This, I admit, has the effect of correcting previous accounting errors in the way of erroneous retirement bases and I think it must be done regardless of the terms of the new accounting classifications.

The difference between the priced inventories of acquired property and recorded balances of book value should be shown in Account 100.5, unless the accounting utility has made a self-evident and apparent "write-up" or "write-down" of such acquired property in which case Account 107 would be involved to the extent of such "write-up" or "write-down" as they apply to existing property.

The new classifications require that Electric Plant should be recorded at original cost and retired at original cost by specified units of property. These classifications do not state what means or methods should be employed to comply with these requirements. It is up to the accounting utility to devise these means and it appears that a continuous property record is the answer thereto. Therefore, by using this second method, the original cost of each retirement unit is determined and "earmarked" and a continuous property record is automatically established and by making use of necessary collateral and supporting records these can be used for all retirements of property.

This has been a very dry dissertation, I fear, but it deals with a very pertinent subject which in my opinion is of utmost importance to the entire electric public utility industry, a subject to which all of us here present must give our most serious consideration regardless of what our years of experience in this business lead us to think of it.

I believe in the regulation of electric public utilities. They are public servants and should never abuse their privilege of giving public service, but I close this talk with great misgivings to the ultimate working out of Accounts 100.5 and 107, not only to the utility company's investors, but to their customers.

Original Cost Determination—Paper No. 1

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possible to establish costs directly from the accounting records, since the costs were buried in large annual orders. In these instances, studies were prepared and unit costs estimated with the cooperation of the Engineering Department, using company labor rates, actual material costs, etc. The estimated unit costs were found to conform very closely to the trend shown by other types of units from actual analysis.

Determination of Original Cost

The developed unit prices were applied to the summary quantities recorded in the inventory for each year, and a resultant total determined for each P.S.C. account. *This total was the original cost of the existing property.* A comparison of the established totals for each account with the actual book balances disclosed a number of sizable differences. In some instances, the book balances exceeded the established totals and in other cases were less. In the aggregate the established original cost amounted to approximately 98% of the book balance which was in excess of $80,000,000. The difference between the established original cost and the book balances were adjusted for each account.

Conclusion

We have thus established actual original cost for this system, adjusted the books to agree therewith, and have in operation a detailed Continuing Property Record priced at original cost and continuously maintained in balance with the books. It is estimated that the cost of establishing the original cost, exclusive of the cost of placing the record on machine operation, did not exceed $1.50 per thousand dollars of plant investment. The system has now been in operation for approximately a year and the benefits being derived therefrom in the way of routine retirement data, statistical data, etc., appears to more than offset the initial outlay.

In closing I wish to state that while it is obvious that the subject of determination of "Original Cost" is too involved and extensive to cover adequately in a single discussion it is hoped that this presentation might be helpful as a constructive approach to a difficult problem.

That Crisp County Plant

"PUBLICLY OWNED PLANT LOSES"

"A dispatch from Washington says the Federal Power Commission for the fifth consecutive year has remitted the $1,000 license which the Crisp County Power Commission is supposed to pay.

"The fee is remitted on the plea of the Commission that it lost money in 1936, as it has done every year since it began operations. The deficit for last year is placed at $19,000.

"It seems obvious that if the Crisp county plant has lost money, the deficit has been made up out of the money of the taxpayers.

"All this throws a flood of light on what is called the municipal ownership and control of light and power plants. The number of them has been declining steadily for 35 years because they were not as efficient as privately owned utilities and the low rates are made possible by taking the difference from the taxpayers.

"This is exactly the contention of those who oppose the operations of TVA and even more vigorously oppose the establishment of regional TVA's in six other sections of the United States. We know the taxpayers are paying the piper in the Tennessee Valley and they will do so in every other region in which government planning is set up."—*Macon, Ga., News, Nov. 5, 1937.*

Cost Allocations in Combination Companies

By H. C. Davidson

Secretary, Consolidated Edison Company of New York, Inc.

Presented before the National Accounting Conference, E.E.I., Detroit, Mich., Nov. 10.

THE subject of "Cost Allocations in Combination Companies" assigned to me by your distinguished Chairman, is a controversial one. As far as I can learn, there is no standard practice of distributing expenses common to more than one department, nor any great unanimity of opinion as to the true "yardstick" for such apportionments. (I use the word "yardstick" in its correct meaning—not in the sense of a "nightstick," with which it seems to have become synonymous in some quarters.)

Let me say at the start that I do not bring any panacea to solve the problem. Instead, I only hope to discuss some of the fundamental questions of accounting policy inherent in it. By way of qualifications for such a discussion, I call to attention that although we are young as a Combination Company, we are seasoned veterans in the analogous field of apportionment of joint expenses among affiliated companies.

From all the information that comes to me of the practices now in effect, I gather the impression that the record generally will bear improvement, both as to the basis of distribution and the underlying data in support of such a basis. I say this not in spirit of criticism, but instead in the hope that if any of you think you have something particularly good in this regard, you will not sit back complacently but will enter into the discussion of the subject.

As you may judge from the parenthetical remarks under each subject in the program, it is evident that your Chairman thinks I have some pet ideas on this subject. At any rate, I shall open my presentation in the manner of the counsel who states at the opening of the case what he *proposes* to prove, by first annunciating certain fundamental principles which I think should be controlling. I will then proceed to discuss their application to typical departmental operations. These principles are:

(1) The basis should be simple and easily understood, and obviously equitable. There are many advantages in such simplicity, even at the expense of greater accuracy.

(2) Once adopted, the basis should be applied on a definite program for a representative period, preferably a year, and should be subject to revision during that time only in the event of material change in conditions.

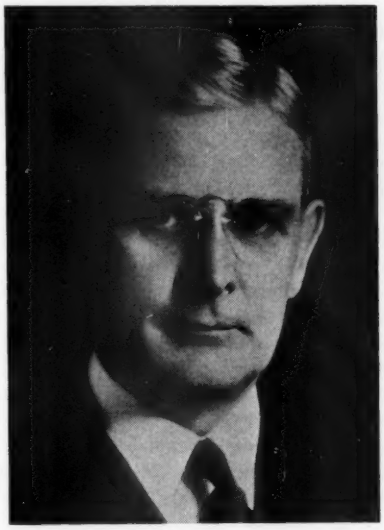
Changes every month are not necessary to substantial accuracy (even though they may be a delight to the accountant's ambitions).

Review of the subject should be made at regular intervals with due authorization by the interested officers of the bases adopted for each year.

(3) As to many items, a distribution based on *informed judgment* has decided advantages over an apportionment based on a *statistical computation.* This is particularly true of joint expenses, where the extent of participation by each department is not the same or the relative costs are difficult of accurate measurement.

(4) Whatever the basis adopted, it should be adequately supported by underlying authority containing such presentation of the facts as may be necessary to show clearly its soundness and property, and bearing the approval of the responsible officers in the conclusions reached.

(5) The general books of account should be factual, as far as possible. Apportionments in the books should be confined to items the distribution of which applies only to the immediate time of entry (such as operating expenses), and should be avoided for items of a continuing nature (such as common utility plant), as to which the proportionate part chargeable to each department may vary from time to time in accordance with changing use.



MR. DAVIDSON

Fixed Capital

The treatment of fixed capital is a logical item with which to start, in testing the application of these principles. We are all agreed that plant and property should be classified directly or factually to the extent possible. In most companies, at least 90% of the property can be so identified. It is on the remaining 10% that we bump into the first question of accounting policy regarding the segregation between departments in the books of account.

To what extent should we allocate in the books general or common property, such as the general office and other buildings used for both gas and electric operations? How far should we go in assigning directly general equipment such as furniture, tools and automobiles?

I belong to the school of thought which believes in reducing to a minimum any current accounting allocations of property by departments which may be correct today and wrong tomorrow. I stand firmly on the ground that common property should be carried *as such* in the books and that if allocation by departments is necessary, as in a rate proceeding, such a computation be made separately from the books to reflect the status as of the desired date.

General equipment may justifiably be classified in its entirety as common property, or may be assigned directly in part in accordance with predominant use, with the balance classified as common. The individual facts will probably determine the preferable accounting practice. I do not quarrel with either method. But generally speaking, I urge that such allocation be confined to the property which is obviously departmental in character, and that all doubtful and borderline items be carried in the common accounts.

If you are called upon to prove your investment in one department, you will find it far easier to sustain the correct distribution of common plant, if you allocate it initially at that time, based on current conditions, than if you have on your books an allocation made earlier, which, although correct when made, may no longer be applicable.

The trouble with trying to carry too far the allocation on the books is exemplified by the experience of one of our

neighbor companies that adjusted its fixed capital to conform to an inventory priced at cost, in which the appraisal engineers who prepared it, allocated directly by departments every item of tangible property. Aside from the additional detail involved in withdrawals resulting from common property being in two accounts, the adjustments between departments were continuous to reflect the constant changes in the use of the property. Needless to say, it was not long before the company substituted its own practical judgment as to the treatment of its property accounts, and transferred to "Common Plant" the items that belonged there.

In this regard, it is worthy of note that the apparent intent of the new classifications recently promulgated by the regulatory authorities, is to require plant to be assigned directly, as far as possible. While we may agree with that objective, we must be careful in carrying it out that we do not lose sight of sound fundamentals.

Taxes

In order that you may not think I am evading the issue, when I counsel against the current allocation of common fixed capital, I will refer next to the item of real estate taxes on your general office and other similar properties, and ask you how you distribute them between gas and electric operations. The natural answer would be "in accordance with use or occupancy," but that is not always easily determined by actual measurement. There are too many combination departments as to which some arbitrary allocation is necessary.

My own view is that a study of the ratio of occupancy as of some given date, such as the beginning of the year, is a pertinent fact to be taken into consideration in reaching a conclusion, but that there are certain objectionable features to applying it literally as a methematical formula. In the first place, if it is to be applied logically, it should be revised every time there is a change in occupancy, which means too much clerical work. Furthermore, the ratio of occupancy, if developed statistically, cannot be entirely factual, but must depend in part on allocations of space occupied by combination departments, and may be subject to challenge through changes in conditions affecting any of those underlying allocations. On the other hand, a careful judgment estimate which purports to give due weight to all relevant factors, seems to me to be better founded, more elastic in its form, and more easily adjusted to current conditions. Such a judgment basis, if litigated sharply, becomes in the last analysis a difference of opinion rather than a matter of conflicting factual proofs.

Turning now to Social Security and Unemployment Insurance taxes, the ratio of payrolls in the gas and electric departments appears to be the natural basis of distribution, although that too calls for the same underlying allocations referred to above. Again a rounded judgment figure may have its advantages, due to the factors which may not be subject to exact mathematical support.

The general trend regarding Social Security taxes, with the apparent support of the public authorities, is that those taxes should follow the labor and thus be spread generally through the accounts. There are cogent practical reasons, however, to warrant the charging of such payments in their entirety to "Taxes." First, that course is consistent with the accounting treatment of other taxes. You do not charge to production expenses the real estate taxes on the land occupied by your generating station, nor do you charge to transmission and distribution expenses your special franchise taxes. Also, it is consistent with the requirements of the Bureau of Internal Revenue under its rule of treating taxes as allowable deductions when accrued or paid, and of excluding them from fixed capital in its formula for the computation of annual depreciation.

In the Federal Capital Stock tax, slightly different questions arise. Whatever the "adjusted declared value" adopted by a Company, the ratio of the assets employed seems to be a logical method of dividing the tax, first between "operating" and "non-operating," and then of distributing the operating portion between departments. The determination of the non-operating portion (if any) can usually be made on a factual basis, but the split of the operating portion requires the allocation of common fixed capital and current assets, for which an adopted basis must be used. This tax has the advantage, however, of being related to the December 31 balance sheet, so that there is a definite foundation for the distribution in accordance with the assets on that date.

Commercial Expenses

And now a word regarding Commercial Expenses. If you had asked me, before I undertook to analyze the subject, what is the proper method of distributing Commercial Expenses, I would have said "that's easy—on the basis of meters on the district, of course." And yet, if we had adopted that basis when we started as a Combination Company, in 1937, it would have resulted in a gross injustice between departments.

The pertinent figures may be enlightening. The ratio of gross earnings in 1936 of the companies now forming the Consolidated Edison as a result of the recent mergers, was—Electric 74% and Gas 26% of the total. The ratio of the number of meters on the district on January 1, 1937, was—Electric 49.5% and Gas 50.5%.

The differences in organization of the Commercial activities of the electric and gas companies, respectively, the differences in accounting practices, the effect of sub-metering and of the greater detail involved in serving the large industrial electric users, and of a greater extent of analysis of electric sales for rate studies, made it quite impossible to find any measure directly related to the number of meters or customers.

I have cited this case to demonstrate that what may appear to be the most logical basis in the world may in fact prove to be utterly wrong. Actually, we have adopted for 1937 a tentative basis of distribution, which was developed after much discussion and study, based primarily on the comparative costs of the last five years of operation as separate companies. While this basis seems to be working out equitably so far, we expect to review the situation carefully before the year's accounts are closed.

Admittedly the basis of past experience is a true criterion only for a limited time. After a few years, it will have become too remote from immediate conditions to be a safe guide. It has merit during a transitional period, however, until the operations as a Combination Company have become stabilized, because it will span the period from the old to the new conditions with a minimum of variation in the comparative expenses, and will distribute ratably any savings which may be effected.

For the ultimate determination of our own Commercial problem, we will have to make a comprehensive survey of the departmental operations, after the coordination of the gas and electric accounts has been completed, as a foundation upon which then to establish a ratio

of apportionment to the respective departments.

Chemical Department

A typical example of the judgment basis of distributing expenses between departments came up recently in our Chemical Department. Even though we became a Combination Company last December, the gas and electric testing and research activities of the Company are still being carried on separately.

In connection with plans for combining them, the question was raised as to the method of distributing the expenses. Our Chief Chemist asked if it was necessary that his men go to job orders or standing orders to distribute the time between gas and electric work, or if there was not some short-cut method of accomplishing it. The upshot was that we agreed that factual distribution was not necessary and that substantially the same result could be accomplished through an adopted ratio applied to the total costs.

This item is a good example of the class of expense for which it is difficult to find a true mathematical standard of comparison, such as is possible for Commercial indexing and collecting. Gross Earnings can be justified as a basis of apportioning the combined activities, but even that invites question as to its applicability. And again the soundest basis of accomplishing an equitable result with the minimum clerical detail, seems to be the judgment of the operating executive in charge, with his intimate knowledge of the activities upon which his men are engaged.

Administrative Salaries

I now turn to Administrative Salaries to exemplify another point in this review of practices. The salaries of our executive officers are charged to that account and each month the *total* amount is apportioned between electric and gas operations. I assume that is the practice of many companies. Whatever the method of distribution, the record should clearly show that it is *only the aggregate cost* which is being distributed, and that under no circumstances could the adopted percentage be alleged to apply to individual officers.

Incidentally, it is my observation that the public attention focussed on the electric industry in recent years is a factor for which allowance must be made in adopting a sound basis of apportionment of executive salaries. There is no doubt but that governmental activities have greatly increased the relative burdens on the time and attention of management in the conduct of electric operations. On top of that, the greater technical detail and engineering problems of rendering electric service has its effect upon supervisory personnel, and the faster growth of the electric industry places relatively greater demands upon management for future planning, both engineering and financial.

When all of these factors are considered, I wonder if the accepted basis of distribution in accordance with gross earnings does not unduly favor electric operations, and if it should not be weighted to compensate for this generally known condition.

Advertising

Advertising exemplifies certain further problems of apportionment between departments. It is particularly difficult to measure accurately the relative benefits of expenditures for general advertising, such as newspaper and radio, and an arbitrary distribution of a substantial part of the total advertising cost is inevitable.

In the Combination Company it is a common condition that electric service is rendered in a larger territory than gas, that there are consequently more electric customers than gas, and that the overage sales per customer are greater for electricity than gas. On top of this natural predominance of electricity, it is frequently the case that there is a relatively greater volume of electric advertising.

There just does not seem to be any mathematical formula that will fit these conditions, and in fact it is hard to support any distribution with factual evidence. So we are again forced to rely on an informed opinion of qualified officers, as to the proportion of the advertising expenses reasonably chargeable to the respective departments.

Advertising offers also a good example of another element which enters into various expenses and is worthy of consideration in departmental apportionments. That is the "ability to pay." It seems to me that any authorization of an advertising expenditure must take into account the ability to pay, as a part of the exercise of good business judgment. The relatively more prosperous condition of the electric industry and the greater possibilities of realizing benefits in an expanding business, undoubtedly influence the amount expended, and the Electric Department should bear the burden of that condition.

But it cannot be used as an excuse to load down electric expenses beyond the point that can be affirmatively justified as a good business venture. As a practical matter, therefore, the ability to pay is an element to be considered only to the extent of giving recognition in the electric percentage to the generally more liberal advertising policy in the electric industry.

Payroll and Personnel Expenses

In order to cover the full scope of these apportionments, I will refer briefly to the items of Payroll and Personnel Expenses. Here the number of employees in the respective departments is the natural ratio, but as in other cases the same underlying allocations must be made of the Combination Departments. So we find here the same difficulty which permeates every apportionment — that we cannot escape the application in part of the judgment basis, although it is supported by factual data.

Conclusions

Now what conclusions may we draw from the discussion of the various examples? To me certain inescapable fundamentals seem to emerge from the consideration of the subject. These I will sum up in the following manner:

Direct allocation is of course desirable, wherever it is possible, and may be applied to specific expenditures in any account, even though the balance must be apportioned.

For many items there is no ideal statistical basis of distribution between departments.

Nevertheless, every apportionment must have some statistical or factual background, and the merits of each must be weighed, whatever the final method adopted.

The ratio of the number of meters or customers as a method of apportionment has a very limited application and is confined to a few standardized operations.

Gross earnings from the sale of utility services come nearest to representing a reliable guide which is generally applicable in allocating departmental expenses.

Certain other factors, however, which are more difficult to measure accurately, are involved in the apportionment of many items of expense. These include such items as partial participation by one department, faster rate of growth of the electric business, the background of past experience, trends affecting particular operations and other individual conditions, which may affect the proportion each department should bear.

These items find their way into the ultimate apportionment, primarily as diluting or strengthening influences, which are a part of the mental processes of reaching a result, rather than as mathematical methods of measurement.

In the final analysis, therefore, we must reach a composite conclusion from the available pertinent statistical data forming the

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Depreciation Accounting Problems

By Maurice R. Scharff
Consulting Engineer, New York, N. Y.

Presented before the National Accounting Conference, E.E.I., Detroit, Mich., Nov. 9

I PARTICULARLY appreciate the opportunity to discuss this subject briefly before this session of the Conference of the Accounting Section of the Edison Electric Institute, sponsored by the Plant Accounting and Records Committee, for the reason that it seems to me that the time and the place are more than usually appropriate. In fact, I am encouraged to believe that if I can interest this group at this time in the suggestions which I am going to lay before you, there is good reason to hope for some constructive progress toward the solution of this complicated and vexing problem of depreciation accounting.

Now, why do I say that this time is more than usually appropriate for the discussion of this problem? My reason is that, after nearly thirty years of continuous controversy over this subject, we are clearly approaching a crisis in the discussion; and I confidently believe that we may look forward to seeing the problem settled, at least for a long time, during the two or three years immediately in the future. It is of vital importance that this imminent settlement of the problem shall be a sound and constructive one and not an unsound and destructive one.

Why do I say that a crisis is approaching in the discussion? Simply because all of the new classifications of accounts prescribed by the Federal and State authorities have been unanimous for the first time in abandoning the attempt to prescribe either straight line depreciation accounting or retirement expense accounting, and have required, to quote the language of the Federal Power Commission System of Accounts, "each utility shall record as at the end of each month the estimated amount of depreciation accrued during that month on depreciable electric plant." To me, this requirement seems to reflect a major change in accounting policy and to represent a determination to have depreciation accounting record the depreciation or loss in value that actually occurs due to the causes of depreciation. And the vitally important corollaries of this policy, which is now in full force and effect, are the harmonization of the meanings of depreciation in valuation

MR. SCHARFF

and in accounting; and the necessity of measuring loss of value due to the causes of depreciation as part of the practical routine of accounting procedure.

Such a policy seems to have been clearly forecast by numerous discussions of the relation of depreciation in operating expense to depreciation in valuation during the course of the long controversy on the meaning of depreciation, which I will not take time to quote. More specifically, however, it was recently forecast in a memorandum on unification plans issued by the New York Public Service Commission under date of November 10, 1936, when it stated that "the time and expense required to investigate any company or system could be greatly reduced if continuing property records were kept up to date, if the books of accounts showed the original cost, *if the depreciation reserves represented even approximately the amount of depreciation actually existing in the property* and if it were not necessary to estimate reproduction cost." (Italics supplied.)

Similarly, the Committee on Utility Accounting of the American Institute of Accountants stated in its letter to the Federal Power Commission, dated April 1, 1936, in which it opposed the introduction of compulsory straight line depreciation into the then proposed system of accounts as follows: "Provision for depreciation, to have any meaning, can be made only out of earnings, and, these being subject to regulation, it follows that corporate earnings cannot equitably be charged with depreciation on a basis totally unrelated to that used in determining the permitted rates which produce such earnings. Failure to recognize this principle will, in our opinion, lead to serious and harmful confusion in corporate accounts and finance and we can only conclude that the introduction of compulsory straight line depreciation should not be undertaken in advance of general acceptance of the method for rate regulation purposes, not only by state commissions but by the courts of final appeal."

Finally, it may be worth while to recall the question put to one of the witnesses for the Edison Electric Institute by one of the accountants of the Federal Power Commission, at the hearing on the Federal Power Commission Classification of Accounts in the spring of 1936, when he asked, "Suppose the classification simply provided that each company should charge to expense and credit to depreciation reserve each year, the amount or amounts which represented the actually accruing depreciation occurring in the plant, * * * what would be your view as to that kind of a provision?"

If I am right in believing that the problem of depreciation in valuation and depreciation in accounting are going to be definitely settled, and settled in harmony with each other, within the next two or three years, then, as I have indicated, it is of vital importance to the industry that it be settled on a sound and reasonable basis and not upon an unsound and unreasonable one. And yet I am convinced that unless the industry takes an aggressive position in favor of a constructive and progressive program, we may expect a thoroughly unsound and unreasonable solution of the problem. This is indicated by the fact that within the last ten months, the Appelate Division of the Supreme Court of New York has, in two different cases, approved findings of the New York Public Service Commission that the straight

line method reflected actual depreciation both in determining fair value and in establishing the allowable charge to operating expense for rate making purposes.

It is significant, too, that in one recent rate case in New York, the accounting division of the Public Service Commission has submitted a recommendation that a company be required to increase its reserves for depreciation to the amount estimated by the Commission as straight line depreciation by debiting the surplus account with the difference. (This recommendation has not yet been acted upon by the Commission.)

In these days, in litigation involving governmental bodies, the tendency of the Courts is strong—and naturally and properly so in my opinion—to accept the thesis of the government when it is met by no adequate substitute program from the other side. It is my considered opinion, therefore, that if the utility industry adheres to the claim that there is no such thing as depreciation in a well maintained property except the cost to restore the property to efficient operating condition, and that retirement accounting with no balance in reserve adequately reflects the financial condition of a corporation, we shall see straight line depreciation firmly established in the law of the land as the measure of the loss in value of utility property from the causes of depreciation. This was clearly implied by the Appellate Division of the Supreme Court of New York in one of the recent cases, to which reference has been made, when it said, "The petitioner contended that no depreciation should be deducted, simply the cost of restoring the depreciable property to a new condition. There was ample evidence before the Commission to sustain its method of determining depreciation."

Still worse, if the industry adopts a stand-pat, obstructive attitude we shall see the dispute over the effect of deficiencies in existing reserves below straight line depreciation reserves, as estimated by the staffs of Public Service Commissions, resolved by the recognition of such deficiencies as overstatements of corporate surplus required to be corrected by adjustment of the accounts, regardless of the creation of corporate deficits or of other effect upon the financial statements of the company. I do not need to point out to this group what such an outcome would mean in the demoralization of financial programs, and in postponement of dividends until capital has been restored by surplus earnings.

Nothing could be more unsound or unreasonable than such an outcome. Straight line depreciation has been properly held in the past to be statistically incorrect, economically unsound, hypothetical, confiscatory and illegal.

In equity and good conscience, companies which have complied in the past with the prescribed requirements of regulatory commissions and the established law of the land in utilizing retirement accounting should have a reasonable opportunity over a period of years to adjust their reserves, by charges to operating expense account, to meet the requirements of the new policy and the new interpretation which is now in the course of establishment in our regulatory procedure and law.

These considerations will be swept aside, however, and such reasonable opportunity will not be given unless a constructive substitute program is aggressively urged upon the attention of the Commission and the Courts. Fortunately the first step toward the development of such a constructive substitute program has already been taken by the Accounting Committee of the Edison Electric Institute when, in its memorandum submitted to the Federal Power Commission under date of April 10, 1936, it recommended that the rigid application of retirement accounting, without any requirement whatever for reserves, be modified to the extent of requiring charges to expense sufficient to establish and maintain reserves within reasonable stated upper and lower limits.

It is true that the suggestion made in the memorandum was that the lower limit should be "that percentage below which adequate provision would not be made for anticipated retirements beyond a limited future period or for other than minor contingencies" and that the upper limit should be "that percentage which will provide adequate accumulations to meet both current and prospective retirements for known causes, the effects of which can be foreseen with reasonable accuracy, and for unforeseen retirements and contingencies, beyond which limit further material increases would not be clearly related to retirement needs."

It is true also that the vagueness of these definitions was brought out in the examination of the committee witnesses, and that on cross-examination one witness for the committee agreed that "the minimum limit of the reserve might have some relation to the observed physical depreciation." The abandonment of the strict application of retirement accounting, with no requirement of any balance in reserve, however, was a great step forward and seems to me to open the door for consideration of what is a reasonable measure of the adequacy of the reserves.

My own view is that the tendencies to which I have already referred are sound and reasonable, and that from the point of view of the industry, as well as from that of the regulatory commissions, it is desirable that the amount of actual depreciation or loss in value due to the causes of depreciation existing in the property be adopted as a guide to determination of reasonable balances in reserve.

The actual depreciation existing in the property at any time can be detemined by inspection and observation of its condition and of the extent of physical deterioration, supplemented by engineering studies of the extent of actual existence of obsoleteness due to progress in the arts, inadequacy, change in use and requirement of public authority. Such inspections and observations must be as complete as possible and must frankly recognize every form of physical deterioration as a cause of depreciation or loss in value regardless of whether or not it affects continued efficient operation of the property.

Engineering studies of obsoleteness must frankly and fully recognize actual progress in the arts, and must develop methods of measuring the resultant loss in value by evaluating the present worth of the savings in expense, the improvement in quality of service, and the increase of safety or reliability that would result from the utilization of the most efficient available modern equipment.

Studies of inadequacy and change in use must fully recognize these conditions where they exist and must develop suitable scales for measurement of their effects.

When the actual amount of depreciation existing in a property has once been determined, it may be utilized as a basis for apportionment of existing reserves into such subdivisions as may be required by the applicable classification of accounts; and as a guide to policy in building up reserves over a period of years so as to affect the transition from retirement reserve accounting to depreciation

reserve accounting. The rate at which such depreciation is continuing to accrue and the probable amount of depreciation that will exist in the property at the end of the ensuing year, can also in my opinion, be determined from year to year by continuous study of the past history of the property, of the period within which the existing depreciation has occurred, of the effect of maintenance in retarding and restoring depreciation, and of the effect of proposed additions, retirements and maintenance expenditures upon the condition of the property. Such study will recognize that some portion of depreciation, as in the case of the deterioration of certain types of property, does progress proportionately to the passage of time; whereas other causes of depreciation, which are responsible for the great majority of retirements, become effective at the times when definite events occur, such as the development of new methods or equipment, a change in method of operation or in demand, etc. Annual review will permit constant adjustment toward the desired ideal of establishing and maintaining reserves which will be the same proportion of the book value of depreciable property as the loss in value due to the causes of depreciation is to the value new; and new physical inspections and complete engineering studies at intervals of five to ten years can supplement such annual reviews so as to avoid too wide a variation between the reserve ratios and the actual facts.

Such a procedure will avoid the errors of the straight line depreciation method and the retirement accounting method alike, and will lead to reserve balances which will fall somewhere in between the inadequate amounts that correspond with retirement accounting, and the excessive amounts that correspond with the straight line method.

It is my opinion that the reasonableness of such a procedure can be successfully established and that the aggressive adoption and support of such a reasonable program is the best protection that the industry or any member company can have against the permanent establishment of the legality of straight line depreciation and against the establishment of the principle that deficiencies in reserves constitute overstatements of corporate surplus.

I suggested at the beginning of this talk that not only the time but also the place was particularly appropriate for consideration of this subject. I think that I have amply demonstrated its timeliness. With respect to the place, I will only say that I do not believe that the industry can look to any other section of its organized activities for so large a contribution to the solution of this important problem as in the case of the accountants, particularly those engaged in plant accounting and record work, and the engineers engaged in cooperation with these accountants.

It is to the members of this group that the industry must look to bring home to the executives of utility companies the financial threat involved in the present depreciation situation. They must convince their officers and directors that adequate provision for depreciation can no longer be made secondary to and dependent upon the maintenance of the existing level of net income at present rates or at rates constantly reduced to meet the demands of public officials avid for public recognition; and that the only sound policy under present conditions is the charging of adequate provisions for depreciation and insisting upon rate structures that will support such charges in addition to a reasonable return upon the valuation of the property. Even the recognition of the inadequacy of existing reserves and the determination to devote what otherwise would be available for increase of income to the building up of reserves are likely to be futile in view of the pressure of regulatory commissions to convert every possible growth in income into rate reductions.

The members of this group also must make it clear to their companies that it is no longer possible to rely on the decisions of the courts of ten or fifteen years ago, when it was held in various cases that depreciation had no application to the property of a company which was well maintained and which was rendering efficient service. It is a comfortable form of wishful thinking, perhaps, to dwell upon the statement of the United States District Court in a New York case about 1920 that "if, in fact, the capacity has remained the same, depreciation should not be a function of the rate base at all"; and that "it (straight line depreciation) has no application while the plant is kept up"; or on the decision of the Idaho Supreme Court about 1915 to the effect that if it can be demonstrated that the plant is in good operating condition, and giving as good service as a new plant, then the question of depreciation may be entirely disregarded. But no realistic view of the present situation can justify the expectation that the same point of view will now prevail.

Many difficult technical problems remain to be solved before the program here advanced can be successfully carried out. Standardization of methods of measurement of the effects of the various causes of depreciation is essential and clarification at many points is desirable. I venture to hope that the Plant Accounting and Records Committee will continue to make this problem the subject of intensive study and consideration during the next few years and that through its efforts a reasonable solution may be worked out which will be acceptable to the Commissions and the Courts, and which will contribute to the permanent financial stability and prosperity of the electric utility industry.

Cost Allocations

(*Continued from page* 495)

underlying structure, and evaluate it in a result which we define as "informed judgment."

Now gentlemen, that may sound like an ideal, dressed up for this occasion, but I assure you it reflects the processes through which we have gone, and are still going, in attempting to reach a defensible distribution of our expenses between gas and electric operations. I have faith enough too to believe that in pursuing that course, we are measuring up to our responsibilities in building soundly our accounting structure.

In closing, may I urge that whatever the bases adopted for the several items of expense, you insure that as to each there is somewhere in your underlying records a memorandum, duly approved, setting forth the broad grounds of your conclusions reached, and in such form that in your absence your successor could sustain the propriety of your action.

N.A.R.U.C. PROCEEDINGS FOR 1937

The Proceedings of the 49th Annual Convention of the National Association of Railroad and Utilities Commissioners, held at Salt Lake City this summer are now off the press. The book is a volume of 580 pages, with copious index, attractively bound, and well printed. The price is $6.00 a copy. Orders should be addressed to the Association's official reporters and publishers, The State Law Reporting Company, 30 Vesey Street, New York, N. Y.

Elimination Of Final Bills For Customers Who Continue Using Service

By John A. Williams

Assistant Controller, Niagara Hudson Power Corporation

Presented before the National Accounting Conference, E.E.I., Detroit, Mich., Nov. 10

FOR many years most utilities have prepared final bills for all disconnect or "out" readings irrespective of whether or not the customer had placed an order for service at another address in the city. This practice results in the rendition of two bills in one month to those customers who have moved and who have continued to use the company's service, i.e., a final bill for the old address and an initial bill for the new address.

The reasons for this have always been difficult to explain to customers. The vocal customer usually says that he cannot see why he should receive two bills in one month just because he happened to move across the street, around the block, or even clear across the city. He says that John Wanamaker (or maybe Marshall Field or J. L. Hudson) does not send him two bills for the month that he moves; that such stores merely send him one bill for the month for his combined purchases at both addresses. Explanations of the complications of geographical ledgers merely leave such customers cold because they do not understand what it is all about.

Difficulties also arise in the collection of such bills, particularly where they remain unpaid for several months at the old address and are then transferred to the customer's new address. The customer may have received two or three bills at the new address without any arrears and then suddenly he receives a bill with the arrears from his old address. Many of them honestly believe that they do not owe such arrears items. Such customers do not keep accurate records of their accounts as they operate on a cash basis, paying their bills as they are received. They believe that if they haven't received a bill for two or more months that nothing is due and it is extremely difficult to convince them that an old item is actually correct.

In order to eliminate these sources of customer irritation and to reduce collection and billing expenses, several companies have adopted the practice of transferring the customer's consumption from his old address to his new address and rendering one bill to the customer for the final consumption at the old address plus the initial consumption at the new address.

Following is a brief description of the procedure adopted by one group of companies to accomplish this result. This plan has been working successfully for four years in straight electric and in combination gas and electric territory having about 700,000 electric meters and 240,000 gas meters. The territory served ranges from hamlets to large urban centers, so that practically all types of customers are involved. All billing is handled on tabulating machine equipment, which fits in well with the plan of transferring consumption, but which is in no wise essential to its successful operation.

The heart of the system is a meter order that shows both the customer's old and new addresses, so that accounts for which the consumption is to be transferred may be flagged automatically. A copy of the "out" order used, and which meets these requirements, is shown in exhibit 1. The orders are written originally with "Ditto" pencil and the required number of different colored "in" and/or "out" orders are duplicated by the "Ditto" process from the original. In all cases the "in" order carries the old address and the "out" order carries the new address if both addresses are given by the customer at the time the order is placed. The address not applicable to the particular class of order is partially blocked out, as shown, to avoid confusion in the working of the orders.

The front and back sides of the meter sheet used are shown in exhibits 2 and 3. This meter sheet is a combination electric and gas sheet and is used for succeeding customers. When "out" orders are worked to the meter book, if the order does not show an "in" address, final bill data are prepared. However, if the "out" order does show an "in" address the consumption is marked "OFF-TRF" as is shown in the Jan. and Sept. lines on exhibit 2. In these cases tabulating cards are prepared upon which the customer's account numbers, name, new and old addresses, reading and transferred consumption figures are entered. These cards are then routed to the new meter book and the transferred consumption is entered on the new meter sheet; as 44 electric and 18 gas shown on the Feb. line of the exhibit. Brackets

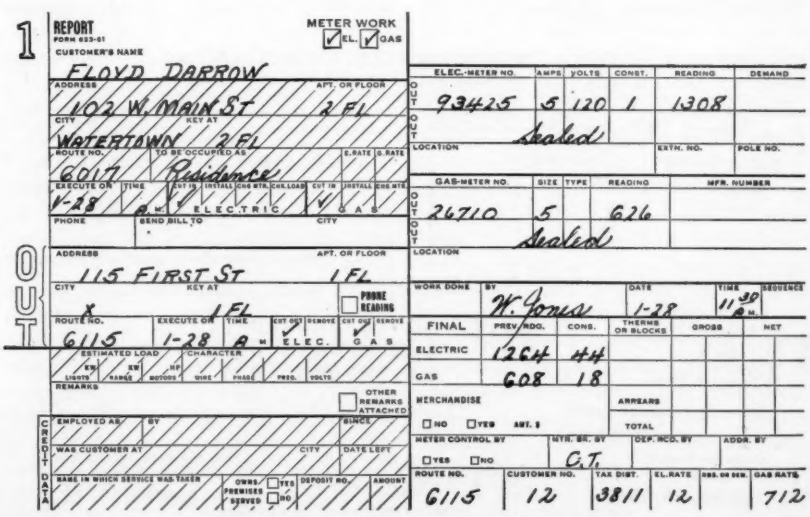


Exhibit 1.

ELECTRIC AND GAS METER READING SHEET FORM 418-46-12

ELEC. METER NO.	CONST.	AMP.	DATE	GAS METER NO.	SIZE	DATE
789236	1	5		274180	5	
				316079	5	5-28-37

	EL. READING	KW-HRS.	REMARKS	NO.		GAS READING	C.CU.FT.	REMARKS
	23944	76						
	23868	476	RR	DEC		1712	22	
	23818	86		NOV		1690	30	
	22332	52	③	OCT		1660	22	③
	21780	40	OFF TRF	SEP		1598	6	OFF TRF
	21440	72		AUG		1592	24	
	20688	68		JUL		1568	20	EST
	20000	76		JUN		1548	28	
	19244	60		MAY	52838	1520	43	24 SET
	18644	66		APR		1440		REM
	17988	118	OK	MAR		1436	26	
	16880	76		FEB		1410	28	
	16044	32 / 44	76 TRF	JAN		1382	22	
	15372	30	OFF TRF	DEC		1360	18 / 10	TRF OFF TRF
	15442	74				1350	10	
	14688	66				1340	24	
						1316	28	

	IN	OUT
4		
3 JOHN S. REGAN	10-1-37	
2 ~~FLOYD DARROW~~	1-28-37	9-20-37
1		1-28-37

6017 ~~FRANK C MIDER~~
10 102 W MAIN ST
WATERTOWN N Y

EL. MIN.	GAS MIN.
UNITS	UNITS
GROSS	GROSS
NET	NET

3811 12 712

LOCATION ELEC. METER: Garage
LOCATION GAS METER: Basement

Exhibit 2.

KEY AT

COMPUTED AND FINAL BILLS

	ELECTRIC			GAS		
DATE	BLOCKS	GROSS	NET	BLOCKS	GROSS	NET
10-14	3/5	2 00	1 92	18257	3 09	2 90

OTHER ADDRESSES

NO.		ACCT. NO.		ADDRESS
1	FROM			
	TO	217	1140	1509 WESTERN
2	FROM	1501	720	115 FIRST ST.
	TO	815	2215	475 NIAGARA ST.
3	FROM	1812	1730	805 N. EDWARDS
	TO			
	M			

PERMANENT ADDRESS

OWNER

BLOCK	RATE	NUMBER OF UNITS TOTAL	NUMBER OF UNITS BLOCK	GROSS	NET
1					
2					
3					

Exhibit 3.

are drawn to the right of the consumption figures as indication to the meter reader and billing clerks that the consumption is to be combined with the customer's initial consumption. Old and new addresses are entered on the reverse side of the meter sheet, as is shown in exhibit 3, so as to give a ready reference to the origin or destination of the transferred consumption.

The next reading day, the meter

(*Continued on page* 508)

CENTRAL NEW YORK POWER CORPORATION
58 PUBLIC SQ., WATERTOWN, N. Y.

Present Reading	Previous Reading	Kw-hrs. or 100 Cu. Ft.	100 Sq. Ft. or Max. Demand		Gross Amount	NET AMOUNT	Service & Rate No.
1308	1264						EL 1
1604	1572	76			3.73	3.38	EL 1
626	608						GS 71
360	350	28			4.99	4.71	GS 71
				TOTAL AMOUNT→	8.72	8.09	

Gross Amount	NET AMOUNT	Service
		EL
3.73	3.38	EL
		GS
4.99	4.71	GS
8.72	8.09	TL

OFFICE HOURS
8:30 A. M. to 5 P. M.
Sat. 8:30 A. M. to 12 Noon
SEE OTHER SIDE FOR RATES AND LOCATION OF OFFICES

SERVICE CODE
EL -Electric
GS -Gas
EA -Electric Arrears
GA -Gas Arrears
AR -Combined Arrears
CR -Credit

6017 FLOYD DARROW
10 102 W MAIN ST
WATERTOWN N Y

6017 FLOYD DARROW
10 102 W MAIN ST
WATERTOWN N Y

This bill includes service used at former address not previously billed.

Service for Period Ended
February 26, 1937

NIAGARA HUDSON

The NET AMOUNT Payable On or Before
March 11, 1937

The GROSS AMOUNT Becomes Due After
March 11, 1937

PLEASE BRING THIS BILL WHEN PAYING AT OFFICE OR AGENCIES

IF YOU PAY BY MAIL PLEASE ENCLOSE THIS COUPON

Exhibit 4.

Some Fundamentals In Standardization—Thirty Years In Retrospect

By Frank B. Jewett

Vice-President, American Telephone & Telegraph Company and President, Bell Telephone Laboratories, Inc.

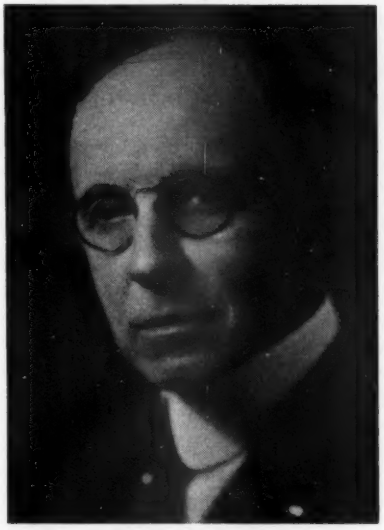
An address at the Annual Luncheon Meeting of American Standards Association, Dec. 1, 1937, New York, N. Y.

IN presuming to speak to this group, concerned as they are with the details and intricacies of standardization, I cannot escape feeling somewhat like an embarrassed Rip Van Winkle. Although I have been interested in and more or less concerned with standardization in applied science for over thirty years, it has been a long time since I have had any active part in attempting to formulate standards. Actually I have not had time even to bring myself up to date on the details of your standardizing machinery.

As a matter of fact my last participation in standardization work had nothing whatever to do with standardization per se. It was concerned rather with some of the problems involved in the creation of this body and the formulation of procedural machinery capable of producing the things we designated as standards. In view of all this, you will probably not wish to take some of my observations too seriously.

During these thirty years our concept of standards has changed greatly. Initially we were concerned mainly with rather simple engineering standards—blood relation to the standards of the fundamental scientist. Gradually we have seen them evolve where necessary to incorporate elements primarily important to the operator and user or consumer. The circle of those around the council table has enlarged as has the field in which progress by standardization is essayed. Each major enlargement has almost invariably been accompanied with some element of conflict of opinion. The established standardizing group (or some of them) are always, and for the most part wisely, hard to convert to radically new ideas projected from the outside and from peculiar angles.

In the early days engineers were forced into attempts at standardization in order that they might discuss intelligently matters of common interest and to compare results. These matters were of little interest to others at the time.



MR. JEWETT

For the most part the work of their committees and associations was of scant concern to the community which was coming more and more to use and depend on the products of engineering craftsmanship. In this respect, more possibly than in any other, the changes wrought by three decades of evolution have been far-reaching not only on the operations of society but likewise on the methods and objectives of standardization itself.

This Association, which is the direct lineal descendant of the first engineering society standards committees, has come gradually into a position of great power and grave responsibility—greater and graver even than most of us appreciate, I suspect. Not only does your imprimatur influence directly the things of industry with which you are concerned and the affairs of their users, but in many directions it becomes part of the base of statutory regulations, ordinances or laws. It is from this angle that much of your enhanced responsibility for careful, thoughtful and meticulous functioning arises. The formal ordinances or laws of the State are hardy "beasties" difficult to change and almost impossible of extermination. They spawn argument, conflict and litigation at a prodigious rate and of a kind that gladdens the heart of those who like to fish in muddy water. Since much of this water is now of your making, it behooves us to look well to its quality and filtration before turning it into the public distribution system.

Outside what I have observed of standardization in other fields of applied science, substantially all my ideas concerning it, concerning its possibilities and limitations, concerning the objectives for which it is undertaken, and particularly concerning the basic rules which, it seems to me, should govern approach to the formulation of any standard, have been derived from the experience of nearly thirty-five years devoted to the orderly development of electrical communication. Throughout this entire period, standards and standardization have been looked upon as powerful tools for progress in the communication art. Occasionally, but not often in recent years, they have turned out to be serious obstacles to it.

Having determined many years ago to make the development of telephony and its collateral forms of electrical communication in the Bell System as far as possible an orderly process based on established principles of science and engineering, it was inevitable that standards and standardization should early come in for careful analysis. Because of the peculiarly favorable conditions for unity of operation present in the structural set-up of the Bell System—research, development, manufacturing, installation and operation all under a common direction and with all parts of the organization concerned with a common objective—our experience might be considered in the nature of a trial installation of standardization under ideally controlled conditions. While all of us have subscribed to the common objective of the best and most extensive service which science and art can provide at the

lowest cost consistent with financial safety, I would not have you think we have been free from violent differences of opinions in the matter of standards to be adopted or altered. In so far as matters relating to standards were wholly of internal concern, the one thing we have been spared was the conflict of divergent views based on real or assumed differences of objective.

Since the only thing we sell to the public is service, we have in the main been free also from the ordinary manufacturer-customer conflict of requirements in our standardization of the material things required for giving that service. To a considerable extent it is immaterial to us which of two things we decide to standardize, provided only that the one chosen when related to all the other factors which make up final overall cost will give the best life service at the lowest cost. Thus, e.g., as between two designs giving equally good operational results, we have no hesitancy in standardizing the one of higher initial cost if it is clear that by so doing we will save much more than the difference on reduced maintenance expense over its useful life.

My first study of standardization and the function and place of standards led me to certain conclusions most of which have been strengthened by subsequent experience.

In the first place, it seemed clear that when the art had progressed far enough in any sector to make true standardization feasible, the establishment of standards and rigid adherence to them until they were superseded by better standards was the only certain way to ensure orderly and expeditious progress.

In the second place, it seemed clear that the standards set should take account of *all* the pertinent factors and should so far as possible omit *all* nonessential requirements; in a word, that they should make mandatory only those things clearly necessary in the attainment of a desired result and should leave maximum freedom for variation in all else.

In the third place, it appeared that standards should never be allowed to take on the habiliments of things sacrosanct but should be under continuous critical surveillance; that they should be discarded or modified promptly whenever it was clear that they had ceased to be tools of progress and become hindrances to it instead.

As a result of these and numerous other fundamental considerations which will occur to all of you, standards as we employ them in the Bell System are frequently short lived affairs. We respect and value them for the help they give us while they live. We refuse to let them dominate our thinking and we discard them without a qualm when they become shackles. I think our attitude toward them might be expressed by saying that in our picture today's standards are today's statement of the most we know about the things we employ. Tomorrow's standards may or may not be the same. One thing we do do when discarding an old friend is to be sure that the new one will serve us better and, so far as possible, to have a definite bridge between the old and the new.

Another thing we learned early in the game was that a nice question was involved in determining just when to attempt standardization. If it was attempted too early in the development of a new thing or a new method we ran not only risk of wholesale use of something inferior to the best attainable, but to a considerable extent we shackled and strait-jacketed development. If standardization was too long deferred development and use tended to run riot and produce a situation akin to one in which there were no standards or guide-posts to serve as definite points of departure.

On the whole I am inclined to think that the first, i.e., a too early standardization, involves the greater hazard. It is a serious thing to stimulate the use of an inferior thing or method by designating it as a standard. It is a far more serious thing to shackle and delay development by so doing.

The establishment and promulgation of engineering or industrial standards always has a powerful influence on men's thinking and acting. There is universally a tendency to think and work *toward* a standard—seldom away from it unless those concerned with the thing standardized appreciate fully that the standard is simply a transitory affair. Men will invariably spend more energy and thought in the direction of achieving the standard than they will on breaking new ground beyond it. They have a tendency to exercise their energy and inventiveness largely in devising cheaper ways than formerly of attaining standard results.

Where the established standard is distinctly above the average of the things to which it applies, this magnet-like tendency has its advantages since it stimulates those who are in the inferior position to seek a higher level, and, since they are in such case a majority, it acts to raise the general level even when it retards somewhat those who have been most progressive.

With premature standardization also all the forces involved are marshalled largely behind the status quo. Custom, established methods, money invested in tools or plant—all argue against change. It is so upsetting! On the other hand, where proper standardization has been delayed beyond the time when it should have been done, the very turmoil and chaos of the resulting situation almost automatically impels conflicting interests to seek a common meeting ground. Further, from the welter of confused experience there is much material that can be salvaged in the making of a standard.

Although I realize the difficulties inherent in the process, it has always seemed to me that the tool of "trial installation" could in many cases be a valuable addition to the machinery of standardization. Possibly in my ignorance of modern standard-making methods, I am advocating something which is already in effect. All that I have in mind is a field trial of the thing proposed on a sufficiently large scale and under sufficiently complete observational control to test thoroughly all the factors involved without committing everybody in advance to the new proposal. In a way the "tentative standard," or whatever you designate it, is along the lines I have in mind, although as I have observed its operation in some cases it seems to fall short of what I have in mind. It invites and depends largely too much on uncontrolled and uncoordinated observation and so retards final decision and leaves that decision largely involved in a compromise of opinion.

In the Bell System where, as stated earlier, research and development, manufacturing, engineering, installation and use are all looked upon merely as parts of a common problem, and where standardization is undertaken solely to insure the best that the current art affords and to facilitate improvement in the elements involved in rendering service, the controlled field trial has long been an established routine. No new thing of any importance is ever put into general use without it. Primarily designed to bring to light defects or improvements which have either been overlooked in the laboratory or which from their nature can only be determined in the field, it serves almost automatically to determine the requirements of new standards which can and should be established for use until

they in turn are supplanted by still better ones. It is, in fact, use of industrial guinea pigs. While it does frequently involve experimentation on the ultimate consumer, it is only on a limited group of consumers, so that adverse reactions can never reach major proportions.

When it comes to how standards should be made and who should participate in their formulation, it has always seemed to me that machinery like that of the American Standards Association or some body similar to it is the only sensible kind to employ, except possibly in those fields involving matters of such vital importance to the general population that only political Government has the power to cope with them. Even here, however, it is hard to see how an organization such as American Standards Association can fail to be of the utmost assistance. The technical and scientific world has become so complex and controlling factors in almost every sector are found in such unexpected places, that only by having a forum where every one who has a right to be heard can be heard, are we assured of that final judgment which will command adherence and respect. Furthermore, it is only from such a voluntary association that we can expect to have that degree of compromise without which no industrial standard, however perfect and desirable it may appear to its makers, can hope to succeed. I have observed that it is the exception rather than the rule when men are reasonably unanimous in acting like rational human beings. Ordinarily we are a perverse lot who greatly dislike being told what we must or must not do even when we know that the prescription is clearly in our interest. If, however, we feel we have had our day in court we are usually ready to give the verdict a fair trial, including a peaceful appeal, if necessary, to the court if we are still dissatisfied, before we resort to arson and mayhem.

It is when we feel that our interests have been grossly outraged or our evidence slighted and passed over in the final decision that we put on our guerrilla togs and go out on a foray. All of this is just as true in the field of standardization as it is in any other area of human activity. Any standard which is made and promulgated in opposition to the fixed opinions, however acquired, of any considerable group involved in its operation, is foredoomed to hard sledding and almost certainly to failure. Such a group would be more than human if they did not seek to make it fail.

It was considerations such as these which long ago led me to feel that to be successful in the field of standardization, the body responsible for a work which has become increasingly important to industry and commerce and to society generally, should have certain characteristics. It should be a voluntary association with the broadest possible constituency in the field of its interest; its operations should be democratic with all that that implies of much essentially futile discussion and apparent procrastination; it should let facts, so far as they can be obtained, rather than opinions determine the answer; finally, the Association itself should not be clothed with any police powers of enforcing its own findings—it should depend on the proven validity of its conclusions and the recognized standing of its members if it would insure general acceptance of its work.

Apropos of these two last points, I should like to remark that they but paraphrase observations made to me many years ago by two wise men, now dead, who were my friends—General J. J. Carty and Mr. Elihu Root. Early in my career as one of his assistants, General Carty impressed on me the importance of getting facts before forming opinions or drawing conclusions if one wished to obtain a valid and acceptable answer. It was his belief and one he operated on consistently, that the answer to almost any question was 90 per cent automatically self-evident if one took the trouble to assemble and scrutinize the known or ascertainable facts which bore on it. Any one who was ever involved with him in consideration of some knotty problem will never forget the interminable hours, days, and even weeks or months which he devoted to fact finding. It was soul and patience-trying and it led into most unexpected places and to most unexpected individuals but it got results that were rarely wrong.

Long ago Mr. Root pointed out to me the inherent fragility of action based primarily on legal authority and the almost irresistible power which inhered in the judgment of a body of men possessed of no power to enforce that judgment but who were recognized to be men of ability and character and who formed their opinions with studied deliberation.

My distrusts of Government as a maker of standards that affect commerce and industry, i.e., outside those sectors of public health or safety or national defense where Government alone can act, are more basic than fear of intrusion of political factors. They reside (1) in the belief that the agencies of Government, circumscribed as they are of necessity by the restraints of Government, are not in the best position to obtain and appraise all the facts; and (2) that being agencies of Government anything they emit tends to appear more important than it really is and more difficult to abandon or modify. In other words, standards made by Government are, it seems to me, more likely to become instruments of restraint to progress than are those emanating from a mobile body like American Standards Association. When to this is added the almost inevitable tendency that develops in men clothed with apparent authority, to exercise it punitively, it seems to me that the case for the voluntary association in the field of standardization is substantially iron-clad.

Nothing of what I have just said should be construed as a belief on my part that Government should be excluded from participation in the making of standards—quite the contrary. Government should participate largely but, I think, on the same voluntary basis as the other members of the association. Added to its general concern in establishing standards wherever these are clearly in the public interest, Government in times of peace is itself a large consumer and so entitled to be heard. In times of war it is the largest consumer. Anything in the direction of wise standard making in times of peace which will facilitate the functioning of Government and industry in time of war is obviously in the common interest.

I know that all the foregoing is "old stuff" to you and I am not saying it with any thought that it need be said here where all agencies—Governmental and non-Governmental — meet together. What I really had in mind in saying what I have is that possibly my opinion based on long experience may add a pebble to the dyke which periodically has to be raised against a demand that Uncle Sam take on part or all of this standardizing job because he can do it so much better or so much faster. It is usually a plausible tale that is told and it has only one demerit—it is not true.

In concluding I do not know that I can do better than attempt in brief summary to restate my own picture of what proper industrial standards should be, how and by whom they can best be formulated, and some of the things which appear to me we should guard against in their use.

Before doing this I should like, how-

ever, to emphasize two things which, while interrelated, are frequently badly confused particularly by the non-technical public. First, industrial standards are essentially different from the so-called "absolute" standards of science—such, for example, as the unit of time. These "absolute" standards if accurately determined and readily reproducible are "absolute" in a very real sense—they are ordinarily not subject to change with advancing knowledge. They are the scales by which we measure it.

Industrial standards on the other hand are akin to the hypotheses of the scientist. They define our present state of knowledge and they live only so long as they continue to define adequately. As soon as they fail so to define, they are for all practical purposes as dead as the ancient Dodo or the Great Auk and like them are of interest only in the museum.

To the non-technical this difference is not generally understood and from the misunderstanding arises much difficulty. To them "standard" has come to denote something fixed, final and generally desirable. They instinctively resent anything which seems to cast doubt on its paternity and they impute base motives to all who advocate change despite the fact that changing industrial standards are the very hallmark of industial progress.

Now for my summary picture.

To me a proper engineering or industrial standard is a temporary statement which includes all that is really essential of proven current knowledge needed to define the thing standardized. It is a specification which can be met in current commercial practice and a tool by which the art can progress. It carefully excludes everything which is non-essential in order to insure maximum latitude alike to the developer and user. In a word, it is a common meeting place for purchaser and seller with no signs of caveat emptor about.

It is continually under scrutiny by all who have occasion to use it and is subject to ruthless modification or abandonment as soon as it has clearly ceased to function as intended.

It is created by a voluntary association of all groups who have a definite interest in its existence and by representatives of them chosen because of established reputation for competence and ability to weigh evidence, honestly and impartially. The standardizing body itself should be without legal power to enforce its conclusions but like the Supreme Court should depend on the recognized merit of its findings. Where reasonable doubt exists as to the necessity for standards, the Association should err on the side of too few rather than too many.

Where it is known or believed that the standard sought to be established is likely to become adopted into ordinances or laws and so subject to administration by men who have legal authority of enforcement, the obligation on the Association to be meticulous in its final decision is greatly enhanced. Merely to clothe a standard with the habiliments of ordinance or law is to lessen materially our ability to change promptly in the face of changing conditions. With increasing prestige of the American Standards Association there will inevitably be increasing tendency for our gentlemen and lady fixits to enact laws based on its authority. Like "De Lawd" in "Green Pastures," we are great on passing miracles in the form of laws. The only thing that saves us from our sins in this respect is that we don't take the matter too seriously—not even seriously enough to want to stop the practice. It is too much fun and besides it gives us an endless succession of topics for conversation to vary the dry monotony of talk about last night's bridge or Sunday's golf when "I would have made the 14th in three if I hadn't made it in four."

Prime Movers Committee Meeting

W. E. Caldwell, *Chairman*

A MEETING of the Prime Movers Committee was held December 6 and 7 at the office of the Edison Electric Institute in New York City. The personnel of the various subcommittee groups devoted to particular subjects was announced and the usual routine business of the committee was disposed of.

In view of the increasing importance of the behavior of metals at high temperatures, a special committee had been appointed at the last meeting to make proposals on the scope of work and organization of a Metallurgical Section. Mr. Paul Thompson, chairman of the special committee, reported the recommendations of this group and after discussion plans were completed for the organization and scope of a metallurgical section. The Prime Movers Committee also reviewed current activities in this field and discussed the work of the A.S.T.M. committees engaged upon various steel and steel alloy standards.

Considerable discussion was devoted to a proposal which had been made recently by representatives of the boiler insurance companies as to the revision of boiler insurance schedules. The committee also discussed recently received information on welding practices.

The status of current work in the hands of the Boiler subcommittee and the Combustion and Chemistry subcommittees was discussed. Mr. Crofts reported on material already in hand for the next Turbine Subcommittee report and also reported on the status of the forms for turbine availability data. Mr. Drabelle is collecting operating data on diesel engines and on other diesel subjects for possible consideration in connection with a report next year.

Upon conclusion of the meeting many of the members participated in the annual meeting of the A.S.M.E. and also took advantage of numerous inspection trips which were available in this connection.

Meeting of Subject Committee on Underground Methods and Accessories Transmission and Distribution Committee

A SPECIAL invitation has been extended to members and non-members of the Transmission and Distribution Committee to attend the meeting next month of the Subject Committee on Underground Methods and Accessories of the Underground Group of the T & D Committee. Primarily the time will be devoted to a round table discussion of underground problems, troubles, etc. However, brief discussions on subjects for future study and consideration have been planned.

This meeting will convene on January 7, 1938, at the William Penn Hotel in Pittsburgh, Pa. Both morning and afternoon sessions have been scheduled. Mr. J. A. Brooks, Chairman of this subject committee anticipates a large and interested attendance at all sessions.

Service

By H. T. East

Public Service Company of Northern Illinois

An address before the Indiana Electric Association, French Lick, Ind., Oct. 23, 1937

"SERVICE" is the most overworked word in the English language. We hear of service clubs, service stations, service organizations, service this and service that. Here in southern Indiana we even have service trees on which service berries actually grow. Although a more original word would be preferred, service happens to be most aptly descriptive of the thing I am to discuss and until we find a better one, its present name will have to suffice.

What is Service any way? The dictionary defines the word service as "ANYTHING DONE FOR THE BENEFIT OF ANOTHER," and this is a very good definition. The term is so hackneyed and applied to so many things and conditions that it means most anything. In the final analysis, SERVICE is EVERYTHING—CONTINUITY OF SUPPLY, ADEQUATE VOLTAGE, FAIR DEALING, COURTEOUS TREATMENT, REASONABLE AND UNDERSTANDABLE RATES, the PLANTS and FACILITIES USED and the MEN and WOMEN EMPLOYED by the organization as well as the COMMODITY ITSELF.

In those states with utility commissions where SERVICE is defined by statute, the term is given a broad and inclusive interpretation which embraces everything pertaining to the business. Thus, legally as well as logically, the true function of an electric utility company is not the production, distribution and sale of electricity. The monthly bill which our patrons pay us every month (or nearly every month) is not in a true sense payment for electricity supplied but payment for homes lighted, work performed or heat used. The real function of our industry is to render a service to its patrons and we must accept this point of view before we can expect material improvement in service the customer receives.

It has been said that service is the archstone of all human relationship. Be this as it may, it will be found nearly all of the more successful business undertakings and a majority of the world's outstanding personalities owe their fame and success to the conscious or unconscious application of this principle. Consider some of the great names in American history — Washington, Franklin, Lincoln, Edison—all men who unselfishly dedicated their useful lives to service in the interest of their country, their cause, or their fellow men. By their concentrated devotion to the interests of others, they brought undying and unsought fame to themselves. Without a doubt, other men with much greater inherent ability achieved a much smaller measure of fame or success and were soon forgotten because they applied their talents along more selfish lines without any honest attempt to render a full measure of service to others. Business institutions, like men, can serve their own interests best by developing the habit of serving others better.

The physical features of service are so vital that they have received constant attention in the past until today practically all utility companies regularly and fully comply with accepted standards. Utility companies observe these standards not simply because they are required to do so by law, but because they recognize the fact that they represent sound business judgment. We must keep in mind, however, that even 100 per cent perfect physical service does not necessarily mean satisfied customers. Ample proof of this assertion is found in the fact that the vast majority of customers' complaints which a utility company receives do not involve voltage, continuity, or other physical features. The question then is, not *how perfect* but *how satisfactory* is the service we render.

Some people still contend that the rate payer should be satisfied as long as the utility company maintains a supply of electricity at a reasonable rate and minds its own business. Human nature decrees otherwise. The argument that the customers are entitled to only what they pay for is unsound. We deserve no special credit and can make no friends by merely avoiding poor service. It is that extra measure of attention which customers do not demand and cannot expect that pleases them. In fact a very good definition of service is this: "The things you do over and above what you are paid to do or what you are expected to do."

A spirit of genuine service depends not so much upon what we do as upon our manner of doing it. It depends upon the attitude of officers and employees towards their customers, their company and their job. It depends upon the soundness and liberality of policies which affect our customers. It is fashioned by the thousands of daily contacts between company representatives and the public. A hundred and one little things which we are prone to dismiss as unimportant help to establish its quality. Every person in any organization contributes something to the service rendered and it is made some better or some worse, depending upon their attitude and fullness of their contribution. To keep service satisfactory to others we must never become satisfied with it ourselves. Self-complacency is the foe of better service. If we think we are doing all right, we cease to look for (and never will find) opportunities for improvement. My own experience has been that every company has routines, rules, practices and procedures for which there is no real justification. Customer relations committees visiting various parts of the country have never found a single company in which opportunities for improving service and bettering customer relations did not exist. Usually, those responsible for the mistaken polices or practices were genuinely surprised to learn about them. They had simply been overlooked and it took someone from the outside to uncover them.

Kenneth Goode, president of the Sales Executive Club of New York—one of the keenest of contemporary writers on business subjects—recently stated that business success comes most quickly and most easily from two simple things:

First: Finding out what people like and doing more of it.

Second: Finding out what people do not like and doing less of it.

Before we can apply Mr. Goode's principles in our business, we must analyze the needs and the desires of our patrons and also closely scrutinize every

feature of our business. Our self-analysis must be done with thorough frankness. Our efforts to discover what pleases and displeases customers must be continuous. We should endeavor to do everything, to the tiniest detail, in a positively public-pleasing way. Having ferreted out the possibilities for making our service more satisfactory, the next step is to take action to improve it.

At a recent convention one speaker told of a high-pressure book agent's effort to sell a farmer a book on improved farming methods. Although the farmer was fully convinced of the book's value by the salesman's flowery presentation, he still refused to buy. When pressed for a reason, he stated with emphasis, "I don't want it. I ain't farming now half as good as I know how." We laugh at such logic, but many of us are in about the same situation. Recognition of opportunities to improve service is worthless unless it leads to corrective action.

Associated companies in the Chicago Region have recently done considerable work on classifying customers' complaints as a means of checking and improving service. After completion, all complaints are sorted into groups of justified and unjustified as revealed by the investigation. All justified complaints are then carefully classified according to their cause. The resulting data enables us to lay a finger on the error, omission or deficiency which prompted the complaint and to identify the department or individual responsible for that particular customer's dissatisfaction. This plan has proved very beneficial.

We found, however, that 71% of all complaints received could not be classified according to cause, for the very simple reason that they had no cause. Careful investigation had proved them to be unjustified, the company not being at fault in any way. We started to compliment ourselves on the relatively small number of cases in which the company was to blame when we remembered that those 71 out of every 100 complaints represented c u s t o m e r dissatisfaction which, though unjustified in fact, was nevertheless real.

Justified complaints are caused by errors, weakness of system, equipment or objectionable policies. The company can and should eliminate or reduce this group. Correct the cause and future complaints are avoided. On the other hand, unjustified c o m p l a i n t s are prompted by misunderstandings, prejudices, half-remembered earlier difficulties, or experiences others claim to have had. They are largely a state of mind. The only way to prevent unjustified complaints is to better inform our patrons, restore public confidence, and dispel illusions from the public mind. We are now perfecting plans to classify all unjustified complaints with the view of applying some suitable remedy for their prevention. Practically every phase of our business can be improved. Analysis of typical bill forms reveals that the statements of practically every utility could be simplified and bettered.

For years Customer Relations men have advocated that the requirement that residential customers be required to sign applications for service be abolished. Wherever tried, customers have reacted favorably to this change and company interests have *not* been jeopardized. Yet, about 60% of utility companies in America still cling to the outmoded procedure.

Many companies still demand a credit deposit from each and every customer (including, if you please, the Standard Oil Company) and refuse to modify their practice despite proof that better collection results are regularly obtained by companies who only require deposits from patrons who have proved themselves to be poor credit risks. This is obstinancy and resistance to change, instead of sound business judgment. I could mention many more examples of failure to make changes which would please customers and not cost the company anything.

We must not forget that the officers and department heads control company policies. The employees can apply only the rules and regulations laid down for them. They are definitely bound by these restrictions. Each and every policy that affects customers in any way should be carefully analyzed by the management. If any can be modified so as to make them more acceptable to the customer without serious detriment to company interest, this should be done. It goes without saying that any policy or practice that cannot be justified by reason ought to be altered or eliminated entirely.

At the dinner table the other day, my eight year old son propounded a riddle to me. "What is it," he said, "that runs around the house on four legs, wagging its tail and barking and has bright green hair?" When I gave up and admitted I could not guess it, he said the answer was his dog. Then I cornered him about that "bright green hair" part, and he said, "Oh, I just put that in to make it harder." The same motive apparently applies to certain features of our practices, policies, procedures and form phraseology—they serve no other purpose than to make things harder for the customer. Although unnecessary, and serving no useful purpose, they DO irritate and displease customers.

Within the last few years, some railroads have changed the lines of their locomotives and cars. "Stream-lining" they call it. Other roads still believe this to be a lot of nonsense, but it has been proven that stream-lining does reduce resistance, does increase speed, does improve efficiencies, and does draw new business. Maybe our own business needs a little stream-lining.

Let us now turn our attention to our employees and consider their place in the picture. The procedure usually followed with a new employee is to teach him the company rules, regulations, rates and policies but too often ignoring the all-important task of instilling into his mind a proper conception of and attitude toward his job. Our approach is wrong. Try starting out by selecting men and women with the right personality and ability. Make it clear to them from the start that they are really working for your customers not just for the company. Emphasize the thought that their progress in the company will depend largely upon how well they serve its customers. Drive home the idea they can not please you unless they please your patrons. Stress this idea and keep your personnel tuned to it. Since an employee with the customer's interest genuinely at heart can always find a way, job training is r e l a t i v e l y unimportant. Keep that thought in mind when planning your training programs.

Disgruntled customers usually think they are sore at your company. People do not get mad at the sticks and stones and copper and steel that our properties are made of. It is not these material things but some human in your organization that the irate customer is condemning. Since the employees who meet the customer are the company and the mistakes they make are the company's mistakes, the employee is the key to better customer relationship.

The proper attitude of employees toward their jobs is of paramount importance in any public relations program.

Employees who are happy in their work and thoroughly sold on their jobs form a powerful medium for promoting public good-will. The attitude of individual members of a service organization fixes its reputation and determines its effectiveness. This was forcefully demonstrated to me in France during the World War by organizations engaged in welfare work with the American Expeditionary Forces. All of these organizations had the same objective—to aid, comfort and entertain the men of our armies. Each was financed in the same manner by popular public subscription in America. One of them was the largest and best organized, with practically unlimited financial resources. It was headed by gentlemen whose motives and principles could not and never were questioned by anyone. But its personnel was hired, receiving salaries of about $100.00 a month, not high, but three times what the majority of the fighting men they were there to aid received. Although it accomplished much good work, this organization fell into bad repute with the officers and men of the A.E.F. largely because of the attitude of its personnel. Although there were many, many exceptions, its workers were not generally imbued with the spirit of service, but seemed to be just holding a job—working for a salary plus the pleasure of touring a foreign country in noncombatant roles during war times. As a result the cross section of opinion in the army became bitter toward them, a fact that could be accurately ascertained by the commissioned personnel which was required by regulations to read and censor all letters written home.

In contrast there was another and much smaller w e l f a r e organization which had comparatively limited financial resources. Its workers were volunteers, serving without pay, there because they were not only willing but eager to serve their fellowmen and their country during a great national crisis. Naturally, their every act reflected their attitude, and as a result they became endeared to our soldiers. They had the idea of service—the other lacked it. This comparison serves to prove two things, first, that the group reaction of humans to a genuine spirit of service is positive, and, second, that the attitude toward one's job is THE important factor in service.

The importance of a proper attitude and its effect upon one's work can be further illustrated by the story of the three masons. A learned man once passed a place where a great cathedral was being constructed and, noting the difference in spirit and industry displayed by the various workmen, interviewed some of them. Approaching the first stone mason he asked, "My good man what are you making?" Without hesitation the man replied, "$8.00 a day." He approached another and repeated the question. The reply was, "I am making a wall of stone." He then passed on to a third man who was doing similar work and asked him what he was making. The reply was, "I am helping to build a great edifice; a building which will serve a useful purpose; a cathedral which will inspire the passer-by and be a credit to the community." The first man was working for money, the second was simply plying his trade, while the third was enjoying the part he was taking in making possible something big, beautiful and useful. One does not have to guess which workman was displaying the most industry, doing the best work, and deriving the greatest pleasure from it. He alone had the service idea.

If you think employee attitude is stressed too strongly, let me tell you that a survey of top executives in the public utility industry revealed that they consider the lack of a proper attitude on the part of individual employees toward their company and their job to be the greatest single drawback to better service. After years of study and observation those engaged in public relations and service work have reached the conclusion that value of an employee depends as much upon attitude, spirit, tact and personality as upon knowledge, training and experience. Loyalty is a greater asset than cleverness. You can get more service from a blockhead than a sorehead. In an ever increasing degree the worth of an employee to his company is going to be gauged by his or her ability to make friends. There should be no place in our business for those who cannot meet this requirement. One sure way for an employee to stand above his fellow workers and get recognition and advancement is to excell at making friends for his company.

We need friends all right. The procedure of making them is as old as civilization itself and has never been improved upon. To make a friend, you must be a friend and prove it over and over and over again. The industry needs more friends, they are nice to have and represent a definite dollars and cents value besides. Friendships that you may need in the future must be made now. You cannot order them tailor-made on a moment's notice.

You have been attending this fine convention two days, listening to experts tell you *how they did* and *how you can* operate more efficiently, safely, and economically and sell more easily and in greater volume. It is sound advice—take it home and use it. But my duty is to warn you that no matter how perfectly or how safely you operate, your job is not complete nor properly done until the service you render is satisfactory to the customer.

Lest you charge me with being too idealistic and think my program is one of coddling the public, let me insist that I have not, for one moment forgotten that we are business men running business institutions. I am still mindful that electric companies are in business primarily for profit. We need not apologize for that. Do not make the mistake of thinking that the service idea and the profit idea are opposed. Experience has proved that good service is good business. "He profits most who serves best." The most successful utility companies in America today are those that sincerely live up to the highest service ideals. They have found that their investment in service betterment pays big dividends.

There was a period when this utility industry of ours was all "het up" about public relations. A lot of money and a lot of effort was spent on activities designed to build public good-will. It cost us a tidy sum to learn that good-will could not be *bought* by spending money on institutional advertising, public speech making and handshaking with public leaders. These activities informed the public but did not necessarily make friends. Now understand, we are not so bad—in fact we do a pretty good job of it but there is still plenty of room for improvement. Any progress made in bettering our customer relations will be very much worthwhile. If you agree that the utility business should have a deeper and finer concept of service, go home and view your situation with a critical eye, and with a firm resolve to start your company on an energetic program to make its service more complete and more satisfactory.

Brand Is Awarded McGraw Medal for Cooperation

EDWARD A. BRAND, Supervisor of Commercial and Industrial Sales Promotion, Buffalo, Niagara & Eastern Power Corporation, was awarded the James H. McGraw Medal for Cooperation for 1937, at a dinner held at Buffalo, November 30, which was sponsored by the Electrical League of Niagara Frontier and attended by representative leaders of the electrical industry in the East.

MR. BRAND

The Medal is given annually for outstanding individual enterprise in the contribution of ideas which benefit the entire electrical industry. Mr. Brand was presented this year's award in recognition of his work as chairman of the Industry Wiring Committee, which developed and prepared a national specification for residence wiring, The Handbook for Interior Wiring Design. In this work he promoted harmony of purpose among the several branches of the industry and established a progressive specification standard for encouraging more adequate electrical installations.

The citation, in part, stated: "He has successfully brought to conclusion the adoption of standards for interior wiring design, that for the first time provide a clear concept of what constitutes adequacy, on a basis that may be progressively advanced as public acceptance warrants. Also, these standards have prepared a foundation of common agreement and closer team work upon which the electrical industry's Adequate Wiring Promotion Program has been organized."

Floyd L. Carlisle, Chairman, Consolidated Edison Company and the Niagara Hudson Power Company, in the introduction to his address made at the dinner said:

"This is, indeed, a happy occasion for me to visit Buffalo, when one of our own organization, Mr. Edward A. Brand, is receiving this very distinguished award for his magnificent contribution to the electric industry in preparation of The Handbook of Interior Wiring Design. The fact that this award is made to him is immensely confirming evidence of the ability, variety and extent of the organization of the Niagara Hudson Power Corporation and its subsidiaries. This is not a one-man, or a two-man, or a twenty-man organization. It is one of thousands of men, in which ability and character are the sole determining factors in promotion and influence. It is, furthermore, an organization in which the younger men are constantly being brought forward, and Management seeking to advance men of real talent and capacity."

The committee of judges making the award consisted of J. L. Busey, President, General Electric Supply Company; J. L. Flagg, President, Watson-Flagg Engineering Company, Inc.; Charles E. Swartzbaugh, President, Swartzbaugh Manufacturing Company; George E. Whitwell, Vice-President, Philadelphia Electric Company, and Earl Whitehorne, representing the committee of awards. Mr. Whitehorne presented the award.

Mr. Brand is a native of Pittsburgh. He was associated with the West Penn Power Company of Pittsburgh following his graduation from the Carnegie Institute of Technology in 1923 and remained with that company as assistant distribution manager until 1926, when he was appointed manager of the lighting and wiring service departments. In 1928 he entered the employ of the New York Power and Light Corporation, a part of the Niagara Hudson system, and worked in the lighting bureau at Albany until 1929, when he was named division commercial manager at Glens Falls. Two years later he was transferred to the Buffalo office.

Mr. Brand has engaged in many committee activities where his services have been in great demand. In addition to his service on the industry Wiring Committee which earned his McGraw Medal, he is a member of the Wiring Subcommittee of the E.E.I. Sales Committee and has been for several years one of the E.E.I. representatives on the Electrical Committee of the National Fire Protection Association which formulates the National Electrical Code. He has also been a member of many joint committees in the wiring appliance and sales promotion fields.

Elimination of Final Bills

(*Continued from page* 500)

reader enters the reading as usual and enters the initial consumption above the transferred consumption, and then enters a total of the two for checking purposes. So far as the meter reader is concerned the account is handled like a "change" meter, as is shown on the June line of exhibit 2.

On the day just prior to billing, the transferred consumption card is checked with the ledgers to ascertain the amount of arrears, if any. If there are any arrears they are immediately transferred to the new account so as to appear on the customer's first bill at the new address.

A copy of a "transferred" consumption bill is shown in exhibit 4. The account is billed in exactly the same manner as a "change" meter account is billed, i.e., two sets of readings are shown, with only one consumption figure for each utility. Where different rates or different demands are involved, separate consumption figures and extensions are shown on the bill. An impression from a rubber stamp—"This bill includes service used at former address not previously billed"—is made on the bill as shown to explain the transaction to the customer.

In most cases this practice eliminates the handling of two prorated bills; first the final bill and second the initial bill. The rates in effect authorize the billing of a 26-35 day period on a one month's basis. Where the combined period is more or less than 26-35 days the steps or minimums are prorated in the customary manner. As most of the cus-

(*Continued on page* 512)

Suggested Procedure For Tests On Generator Windings

By B. Van Ness
Pennsylvania Water and Power Co.

A Progress Report presented at the Fall Meeting of the Electrical Equipment Committee.

ONE of the important problems confronting the operating companies is the development of a method of determining the condition of generator insulation. As a result of the lack of suitable non-destructive insulation tests many failures occur in operation causing interruptions to service followed by expensive repairs. In some instances, machines are rewound simply because other machines of similar age have broken down. A reliable periodic check will both prevent scrapping of windings having many years of useful life remaining and at the same time eliminate many failures in service.

The Electrical Equipment Committee, E.E.I., now has this problem under consideration with the ultimate object of developing, if possible, reliable non-destructive tests for determining the condition of insulation of machines in service and the setting up of suitable dielectric or other tests to be applied to machines after repairs have been made or at any time when an insulation check might be desirable. It is expected that much useful information can be obtained by comparisons between destructive and proposed non-destructive tests on old machines which are to be repaired, rewound or scrapped. In order to facilitate comparisons between tests made by various operating companies as well as to obtain the maximum information, the following procedure is suggested in conducting these tests. This procedure has been divided into two sections, the first applying to machines, the windings of which are to be scrapped and the second to machines in which the windings are to be repaired.

It is realized that the final details and procedure of conducting the tests will necessarily depend upon the time and equipment available in each individual case. For this reason the following is not intended to cover rigid test methods, but rather to outline the tests which have been suggested, and to cover the general procedure to be followed. The following includes, in addition to well known tests, a number of suggested tests, the suitability of which for general testing may be questionable, due to the limited experience which has been had to date. At this time it appears that the tests may be listed, in the order of their importance as follows:

1. High voltage breakdown.
2. Megger tests.
3. D-C resistance measurements.
4. Dielectric absorption tests.
5. Power factor tests.

If time is a limiting factor it is therefore suggested that the tests be considered in the order shown.

GENERAL

Before starting any tests the following should be noted:

(1) The length of time the machine has been out of service before testing.
(2) Possibility of winding being moist.
(3) Condition of cording, blocking, slot sticks, varnish coating, etc.
(4) Corona spots and distortion of end turns due to short circuit currents.
(5) Indications of vibration of conductor and conductor strands.
(6) Degree of cleanliness of winding insulation.

Throughout all test periods, records of ambient air and machine winding temperatures shall be taken and also readings of per cent humidity in the air surrounding the machine.

In preparing the field and armature windings for testing all connections, such as cables, brushes, etc., should be removed. The insulation at the terminals should be thoroughly cleaned to prevent leakage current and consequent errors in some of the tests. A guard connection should be used where leakage of this type is likely to cause erroneous results. Where possible, the field winding leads should be disconnected from their slip rings before any tests are made.

On tests requiring application of a-c voltage to the windings, 60 cycle potential should be used for both 60- and 25-cycle units.

Effect of Temperature

It is well known that the higher the temperature the more marked is its effect on the breakdown properties of certain dielectrics, usually lowering the puncture voltage. An additional factor in the case of generator insulation is the effect of expansion. For this reason the question is raised as to whether the breakdown values obtained with the machine cold are entirely indicative of the conditions of the insulation at operating temperatures.

It would therefore be very desirable if both destructive and non-destructive tests could be made with the machine windings at operating temperatures. It is realized that in many cases it will be impractical to elevate the temperature of the machines for this purpose. Where machines are in operating condition it may be possible to carry load until the windings come up to temperature and then carry out non-destructive tests as the machine cools. This should bring out the effect of temperature on these tests. In the case of high voltage breakdown, where it is desirable to remove the rotor, this procedure probably will not be feasible and it may be necessary to resort to other means of raising the winding temperature. It has been suggested that this could be accomplished by circulating low voltage d-c through the winding or by the use of electric heaters.

Humidity

Generators with windings exposed to the atmosphere may in a day or so after shutdown, be affected by humidity and readings of power factor, dielectric absorption and d-c resistance may be subject to very considerable error. In order to minimize errors due to humidity when making such tests, wherever possible, readings should be taken immediately

after shutdown following a prolonged period of operation.

I—TESTS ON MACHINES TO BE SCRAPPED OR REWOUND

Megger Tests

The insulation to ground of the complete stator winding should be tested, using a 1000 volt megger, and taking readings at one minute intervals over a period of ten minutes or until readings become constant. This test should be repeated on each phase of the stator winding with the other two phases grounded. A one minute reading with a 500 volt megger should also be made to compare with a similar reading by the 1000 volt megger.

After high potential tests (described later) have been made, the windings should again be meggered, using a 1000 volt megger for one minute as a check on the reliability of this method for detecting insulation failures of this nature.

The rotor winding should be tested, using a 500 volt megger and taking readings over a ten minute interval, or until readings become constant.

In carrying out the megger tests, it is desirable that positive polarity be applied each time to the winding and negative to the ground. Precautions should be taken to ground the windings and allow ample time for complete discharge between tests.

If reading can be obtained with the machine hot and cold, these will be of value.

D-C Resistance Measurements

High voltage d-c measurements have two distinct advantages over megger readings (1) a higher voltage and (2) a constant voltage. Based on the limited number of tests which have been made to date the following tentative procedure is suggested in carrying out these tests:

(a) Make tests at various voltages starting with 250 or 500 volts, up to at least the equivalent crest value of operating phase-to-ground voltage.
(b) At each voltage step, maintain constant voltage and continue current readings until they become practically constant.
(c) If possible, measurements should be made with the machine windings hot and cold.
(d) Megger readings with a 1000 volt instrument should be taken for comparison.

In at least one company this method of testing has supplanted megger tests on large machines. As a source of potential, a simple full wave rectifier is used with the ripples smoothed out by a filter. On 2300 volt generators, 3000 volts d-c are used, while 8000 volts are used on generators of 6600 volts and above. A milli-ammeter is used to indicate the flow of leakage current.

With this method important generators are tested every six months and a record of readings kept to determine any change in the condition of the installation. The readings so obtained are compared with the previous record on the machine and also with the readings obtained on duplicate machines in the same power house. It is reported that several incipient failures on 2300 and 6600 volt machines have been detected by this method.

Since the value of the test appears to lie in a comparison of readings made over a period of time, there may be some question concerning the significance of a single set of readings, as would necessarily be the case in the testing of old generators. The committee would be interested in securing data on 13,200 volt windings tested up to 16,000 volts d-c where the windings are to be scrapped and repeated readings can be taken as deliberate damage to the winding is increased in severity.

Dielectric Absorption Test

This test has been suggested as a means for determining the true insulation resistance of an armature winding. It consists of:

(1) Measuring the charging current when a constant voltage from a d-c source is impressed on the winding.
(2) Measuring the discharge current when the fully charged winding is short-circuited.

The difference between these two curves plotted against time should be constant and the applied voltage divided by this current should be the true insulation resistance of the winding. By taking the difference between the charge and discharge current, the effect of the dielectric absorption is eliminated.

Measurements should be made using battery or electric rectifier sources of potential of 500, 1000 and 1500 volts and reading the leakage currents with a micro-ammeter. Readings should be continued over a ten minute period or until constant conditions are reached on both charge and discharge.

Dielectric absorption tests should be made for the three phases in parallel and for each phase individually with the other two phases grounded. Measurements made at various temperatures (as would be possible in the case of old machines which are still in operating condition) as heating and then cooling progresses are needed.

Further details of this method of testing are given in Mr. Robert W. Wieseman's paper "Insulation Resistance of Armature Windings" in the June, 1934, issue of *Electrical Engineering*.

Power Factor Tests

The power factor of the armature winding should be measured at various steps of voltage from about 10 per cent of normal to about 130 per cent of normal leg voltage, with enough points being taken to permit drawing a curve of power factor versus voltage. This should be done for the three phases in parallel, as well as for each phase individually, with the remaining two phases grounded.

If possible this test should also be carried out with the machine hot and cold. Furthermore, it would be very desirable if comparative power factor tests could be made on a single coil and on the entire winding.

High Potential Breakdown Tests

Before conducting breakdown tests, the rotor should be removed from the machine in order that—

(1) Test failures may be localized as much as possible.
(2) Points of failure may be readily seen.

The capacity of the testing transformer should be sufficiently large to prevent excessive wave distortion or reduction in voltage due to the test load. Occasional checks on voltage, using a sphere gap, should be made with the test load connected.

The end connections on the three phases should be opened and with the other two phases grounded, the following tests applied:

First Phase:

Straight voltage rise to breakdown applied to entire phase, the voltage being brought up to breakdown in approximately 30 to 60 seconds. As coils fail either the individual coils or the faulty coil group shall be cut out and the test repeated on the remaining coils.

Second Phase:

With either the coils or coil groups separated electrically, individual straight voltage rise tests should be applied, the voltage being brought up to breakdown in approximately 30 to 60 seconds.

Third Phase:

If the equipment is available, it is suggested that the coil or coil groups be separated electrically and the following high d-c voltage tests applied:

(a) On a portion of the coils or coil groups determine the d-c breakdown

value by applying the voltage in a straight rise to breakdown in approximately 30 to 60 seconds.

(b) On the remainder of the coils determine the insulation resistance by applying a high d-c voltage (5000 volts and up) and measuring the leakage current, the insulation resistance being calculated from the readings. Readings should be taken over a period, sufficiently long to allow the leakage current to become constant.

The a-c tests should show the effect of repeated applications of high voltage and dielectric stress heating. If progressive failure occurs this will possibly be demonstrated by certain coils breaking down at voltage lower than those previously withstood when coils elsewhere in the winding failed. For this reason the sequence of coil failure is of essential importance and enough coils or coil groups should be tested to establish definitely whether any such trend exists.

The location of each breakdown should be carefully noted. It is also desirable to have the actual position of breakdown in the coils recorded as they occur, indicating the location of the puncture in the coil and the position of the coil in the phase group. This information will enable a comparison of the insulation strength of coils near the terminals and coils near the neutral of the winding, and also may bring out any possible inherent weakness in the stator winding.

The d-c tests listed under "Third Phase (a)" should be compared with the d-c breakdown values obtained on the second phase in order to bring out any possible relation between a-c and d-c breakdown values. Should such a relation be established it may prove useful in the future, since as generators become larger, the capacity required in high voltage test transformer may become so large that their cost and difficulty of moving about may become prohibitive.

The purpose of the d-c tests listed under (b) is to determine the reliability of this type of test as an indication of the condition of generator insulation. It is reported that although megger tests failed to detect one case of known damage to a winding the high voltage d-c tests showed a pronounced difference before and after the damage was inflicted. It is further reported in testing one particular generator that a critical voltage was noticed at which high frequency discharge currents suddenly appeared in the kenetron output, as shown by a cathode ray oscilloscope. These currents appeared to increase as the voltage was raised still further. Just what significance may be attached to this phenomenon is as yet unknown but it has been suggested that perhaps the voltage at which the discharge currents first appear may represent the minimum d-c voltage that should be applied in order to detect a general lowering of insulation resistance.

Further d-c test data are needed.

Deliberate Damage to Coils

The insulation on some of the older machines may prove to be in much better condition than expected, thus preventing definite conclusions regarding the correlation between destructive and non-destructive tests. In these cases it is suggested that deliberate damage be inflicted on the winding by hammering, cutting, bending, etc., and attempting to locate these weak points by non-destructive means.

Precautions should be taken against burning the stator iron or damaging coils at breakdown by removing the test voltage as quickly as possible after failure has occurred. The breaker on the low voltage side of the test transformer should be set to trip at a value slightly above maximum test load. As a safety measure a fire extinguisher should be available.

Turn to Turn Tests

Many armature failures may be attributed to the breakdown of the insulation between turns. Therefore, in addition to the tests of insulation to ground, it would be very desirable to obtain data on the strength of insulation between conductors in stator coils of more than one turn. This could be accomplished by opening the end turns and applying tests similar to those outlined for the first two phases.

II—TESTS ON MACHINES TO BE REPAIRED

Megger, dielectric absorption, and power factor tests should be conducted in a manner similar to that described for machines in which the windings are to be scrapped.

Where circumstances permit, it would be desirable to remove a number of undamaged, or perhaps superficially damaged coils adjacent to the point of failure and subject them to a breakdown test on a straight voltage rise, the voltage being brought up to breakdown in approximately 30 to 60 seconds.

Slot sections of such coils shall be enclosed in a metal cell of the same dimensions as the slot and at least six inches of the end section shall be wrapped with lead foil.

APPENDIX A

In addition to the tests outlined in the main body of the report the following two tests have also been used. The results obtained from these tests to date do not appear to be very promising and for this reason it has been suggested that further work along these lines be discontinued. The description below is given for the sake of completeness of record.

Ionization Tests

This test may be carried out by applying various values of voltage to the armature windings and attempting to detect point of pronounced ionization or corona discharge by means of a cathode ray oscilloscope and an exploring coil, or other type of detector and amplifier.

The minimum voltage at which ionization first appears and the voltage at which it can be detected in all of the coils should be recorded. The location of any weak spots, so indicated by comparatively high corona discharge should be marked for correlation with later tests of voltage breakdown.

It may be found that the exploring coil will not pick up indications of ionization from the portions of the coils embedded in the slots in the stator iron, due to shielding effects. In this case the tests must be confined to the end turns only.

Discharge Detection Bridge

This method consists of detecting the presence of ionization discharges within the gaseous spaces or voids between the layers of insulation. It is, therefore, necessary for the measuring apparatus to separate the minute discharge currents from the 60 cycle charging current. Several bridge arrangements are available, all having the principle in common of balancing out the fundamental current in the bridge circuit and filtering out the majority of harmonics which are produced in the testing equipment so that the discharges of high frequency due to ionization in the insulation may be measured. A description of the bridges used, as well as the results obtained on cables are given in Bulletins Nos. 259 and 260 of the Engineering Experiment Station of the University of Illinois.

Readings should be made of high frequency ionization current versus impressed 60 cycle voltage, and when the first ionization begins there should be a sudden increase of current giving a step in the curve. The curve should then continue parallel to the first part until a second point of ionization is reached, as shown by a second step in the curve. There is some question as to the interpretation of these readings. It may be that something of interest would be learned by comparing curves obtained before and after inflicting deliberate injuries to the insulation.

Care must be exercised in making tests of this type to eliminate the effects of stray fields, static, etc.

DATA SHEET NO. 1

Tests on Generator Insulation

1. Type of machine (turbo or hydro generator, frequency changer, synchronous condenser, etc.):

2. Closed or open ventilation:
3. Manufacturer:
   Year installed:
4. Kw. rating: P. F.:
   Voltage: Speed:
5. Neutral grounded, ungrounded, or grounded through resistor or reactor:
6. Armature winding:
   (a) Class A or Class B and allowable temperature rise:
   (b) Insulation construction (secure from manufacturer if necessary):
   (c) Megger reading of each phase to ground at one minute intervals (using 1000 volt megger for ten minutes; also indicate temperature and per cent humidity):
   (d) Megger reading of each phase to ground (using 500 volt megger for one minute; also indicate temperature):
7. Operating history:
   (a) Approximate operating hours of service:
   (b) Estimate of average operating temperature:
   (c) Has machine been loaded on a temperature basis?
   (d) Has machine been operated within definite temperature limits?
      (1) What is the limit?
      (2) How is it measured?
   (e) Has the machine been subjected to the following:
      (1) Prolonged overloads?
      (2) Heavy swing loads of short duration?
      (3) Unusually heavy short circuit currents?
      (4) Frequent exposure to lightning surges?
   (f) Load cycle:
      (1) Wide fluctuations in daily load curve as in peak service?
      (2) Long periods of full load, as in base load service?
      (3) Long periods of shutdown?
8. Mechanical condition of winding:
   (a) What was general condition of winding in place before tests?
   (b) On coil samples removed after test?
      (1) From external appearance, did the insulation appear brittle and dry or flexible and in good condition?
      (2) What internal conditions were revealed by dissected samples?
      (3) Were there evidences of corona?
9. Field winding:
   (a) Class A or Class B:
   Allowable temperature rise:
   (b) Insulation construction (secure from manufacturers, if necessary):
   (c) Megger reading using 1000 volt megger for one minute. Indicate temperature and per cent humidity at time of test:
   (d) If the field winding is to be scrapped, indicate average 60 cycle breakdown of coils:
10. Tabulate any failures which may have occurred in service?
11. The manufacturers of the various machines should be notified sufficiently in advance of any testing to permit their cooperation, either by actual participation in the program or by offering suggestions. At the conclusion of the tests each manufacturer should be supplied with a copy of the test data pertaining to his respective machines.
12. One (1) copy of the complete report should be forwarded to the Insulation Group for file.

CONVENTIONS AND MEETINGS

JANUARY

19-21 American Society of Civil Engineers, New York, N. Y.
24-26 National Warm Air Heating and Air Conditioning Association, New York, N. Y.
24-28 American Institute of Electrical Engineers, New York, N. Y.
24-28 International Heating and Ventilating Exposition, New York, N. Y.
31 Canadian Electrical Association, annual winter conference, Montreal, Can.

FEBRUARY

1 Canadian Electrical Association, annual winter conference, Montreal, Can.
6-7 Prime Movers Committee, EEI, Netherland-Plaza Hotel, Cincinnati, Ohio.
7-8 Electrical Equipment Committee, EEI, Netherland-Plaza Hotel, Cincinnati, Ohio.
7-12 National Electrical Manufacturers Association, New York, N. Y.
9-10 Transmission and Distribution Committee, EEI, Brown Hotel, Louisville, Ky.

MARCH

28-31 Sales Committee, EEI, Edgewater Beach Hotel, Chicago, Ill.

APRIL

20-22 Missouri Association of Public Utilities, Jefferson Hotel, St. Louis, Mo.
20-30 National Electrical and Radio Exposition, New York, N. Y.

MAY

2-5 Engineering Committees, Edison Electric Institute, Edgewater Beach Hotel, Chicago, Ill.
9-13 National Fire Protection Association, Atlantic City, N. J.
22-26 National Electrical Wholesalers Association, Hot Springs, Va.

JUNE

7-9 EDISON ELECTRIC INSTITUTE, Atlantic City Auditorium, Atlantic City, N. J.
20-24 American Institute of Electrical Engineers, Washington, D. C.
22-24 Canadian Electrical Association, annual convention, Seigniory Club, Province of Quebec, Canada.

Elimination of Final Bills

(*Continued from page* 508)

tomers who move to another location in the same city have a tendency to move elsewhere in the same neighborhood the combined period usually falls within the 26-35 day limit, which enables the company to avoid the necessity of prorating a tremendous number of bills where this plan is used.

During the four-weeks' period ending May 15, 1937, the group of companies that use this system had 21,826 "out" orders. Of these, 12,926, or about 60 per cent, were handled on a transferred consumption basis. They thus saved the preparation of about 25,000 prorated bills which reduced their peak and which constituted a real saving when it is considered that special and prorated bills cost at least five times as much as bills handled in regular routine. The companies also saved the mailing expense and collection activities which would have been required to handle the 12,926 "final" bills that were eliminated through the use of this plan.

The principal advantages of this plan may be summarized as follows:

1. Continuity of customers' billing not interrupted by moving and thus conforming more closely to general commercial practice.
2. Greatly reduces the possibility of final bill from previous address failing to appear on customer's initial bill at new address with attendant misunderstanding with customer.
3. Collection problem on final bills greatly simplified. Collection of final consumption made more easily than from a final bill.
4. Considerable saving of clerical expense by elimination of prorating of final and initial bills, preparation of final bills, mailing, collection calls and notices, etc.
5. Customer saved the annoyance of having separate final and initial bills with different discount dates, necessitating separate remittances by customer.

The most worthwhile part of this plan lies in the enhancement of customer good will, a feature in which all companies are vitally interested at this time.

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